ELECTRICAL REVIEW

THE OLDEST ELECTRICAL PAPER — ESTABLISHED 1872

Vol. CXLII. No. 3668 12th MARCH, 1948 9d. WEEKLY

Engineering Aspects

Changing Background to Nationalization

RAPIDITY of technical progress and rate of growth of public demand for its product, the two being bound up together, have distinguished the electricity supply industry from others that have been or are likely to be nationalized. Although many of the undertakings have passed their jubilees, there is no apparent slowing down in engineering developments—rather the contrary. On that account the task of those concerned in the present administrative changes is very much heavier than it would be in a relatively static industry, since they have to be carried out against the background of an operational structure that has continually to be adjusted to meet new conditions.

At the present time the position is, of course, further complicated by the need to make up the leeway in power-station and system construction and maintenance due to the war. This involves more than coping with a deficiency in plant capacity. The extended use of obsolete units and the promotion of single-shift stations to the two- or even three-shift category has introduced difficulties that are not confined to questions of fuel, staffing and additional maintenance, while the installation of new sets has to be carried out without interference with output.

Distribution Development

In many towns high-voltage primary distribution networks should be laid down or, where in existence, should be reinforced in order to deal with the increase in load, much of which comes from new housing estates. In rural areas electrification has become a national necessity, rather than a desirable amenity, at a time when wooden supports for overhead lines are almost unobtainable. Standardization of voltage on the three-phase four-wire system will require the provision of many miles of 415-V cables. Associated with these developments is the need to replace switchgear with that having greater rupturing capacities and the provision of transformers of higher kV and kVA ratings. Another preoccupation is the building up of stocks of tested meters, the statutory requirement for the certification of which was suspended during the war.

Lack of Materials

All these activities, essential to security of supply, have to be pursued in the face of shortage of materials and delays in deliveries which tend to prevent the close keying of dates necessary to ensure the completion of contracts at minimum cost with the least loss of time. Estimates could formerly be prepared on a basis of relatively stable prices for materials and wages. This is no longer feasible and, in addition to entailing the allowance of an uncertainly justifiable margin for contingencies, forecasting throws considerably more work on still depleted staffs. Another call on personnel, which arises out of the lack of plant capacity, is their employment in cold weather on load-shedding operations and their consequences instead of attending to their almost as essential normal duties.

While the above difficulties are inherent in an expanding industry that is con-

tinuously applying new technical developments to improve the service, they have been greatly aggravated by circumstances external to the industry. We have no doubt that under the new regime they will be faced and overcome as successfully as they have been hitherto.

Ministers and Boards

It is to be feared that much of the Commons debate last week on Ministers' attitude towards the nationalized industries, with particular reference to Parliamentary questions, was political in character. As we have already said, it is clearly undesirable, as well as impossible, for Ministers to interfere with the day-to-day running of the services concerned. Yet the public must be protected from any indifference, or even tyranny, of "officialdom" and exposure in the House of Commons is a partial safeguard. But the best protection is the choice of controllers of boards who have the proper conception of their duty to the public and who will consult with the Ministers in order to secure that the best possible service is available.

The Best Approach

As to details of that service Members of Parliament should make sure before raising questions that the boards concerned have had an opportunity of righting wrongs and remedying omissions. An approach by a Member would often secure quickly what the Parliamentary method would take some time to achieve and moreover secure it without engendering the suspicion and ill-feeling which is likely to result from that method. Why treat the boards differently from their predecessors ? They are doing the same work.

B.E.A. and Contractors

At an E.D.A. luncheon last week, Lord Citrine, chairman of the British Electricity Authority, denied an allegation that the Authority had a secret plan to wipe electrical contractors out of existence. Having regard to the terms of the 1947 Electricity Act, the contractors are naturally apprehensive of the future. Lord Citrine said that the E.C.A. would be given the opportunity of submitting its point of view, but this in itself is not much of an assurance. If electrical contractors are to survive they must be able to prove that they are performing a function which nobody else could do better. The co-operation between them which has been achieved in some areas must be tightened and extended so that the Authority and Boards will be able to deal with a unified body rather than scattered individuals. If this is achieved we feel that it will pay the new authorities to encourage rather than eliminate contractors.

Southern Swan Song

There will be many regrets at the disappearance of the familiar railway names and their replacement by "regions." It is fitting that some record should be made of the good work which the companies have done, and this, from our point of view, applies particularly to the Southern Railway. Once a byword and reproach among the public, the name "Southern" now connotes the height of efficient operation and this may be attributed almost entirely to the bold electrification policy adopted by the directors some years ago and assiduously pursued ever since. In departing, the Southern directors leave behind them the greatest suburban electrified system in the world with branches constituting what is in effect main-line electrification. We hope that the plans which were in hand for the extension of the electrified system and the use of diesel-electric traction will be rapidly proceeded with by the new owners.

Lord Rutherford

The discoveries of Lord Rutherford had the outstanding quality of becoming very quickly part of the accepted body of science. The reasons for this were brought out clearly in last Sunday's broadcast by Professor E. N. da C. Andrade. Conspicuous among these was his genius for sorting out, seemingly by instinct, the essential from the trivial, in this way simplifying the lines of investigation that led to the release of energy from the nucleus of the atom. His gusto for research was accompanied by a rare ability to communicate his inspiration to others, thus greatly multiplying his own effectiveness during his lifetime and also in the decade or so that has now elapsed since his death in 1937.

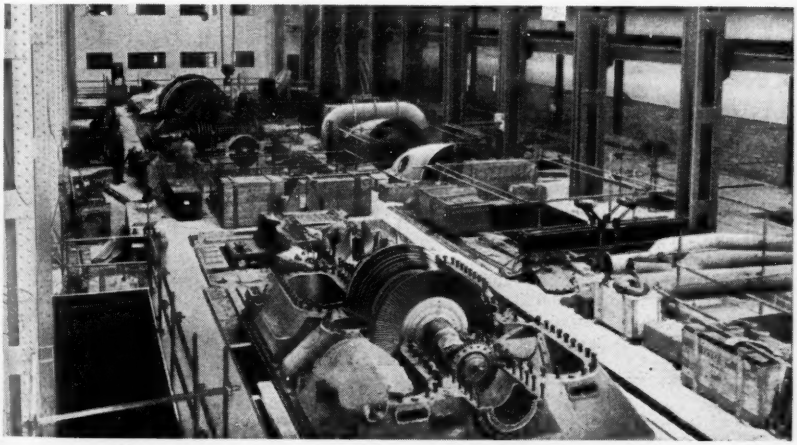
Kingston Power Station

Layout and Construction

FOLLOWING the two articles which described the construction of the Meaford power station of the North-West Midlands Joint Electricity Authority in the *Electrical Review* of 31st January, 1947, and of the Lincoln Corporation's new station in the issue of 9th January, 1948, the new Kingston-upon-Thames generating station has now arrived at a suitable stage in its construction for a preliminary illustrated constructional description.

Direction by the Central Electricity Board for the construction of the station was made in 1939, and although the design work was proceeded with, actual construction did not commence until 1945 because of the war. The consulting engineers appointed for the design and erection of the complete station are Preece, Cardew & Rider, with whom Coode, Vaughan-Lee, Frank & Gwyther act as civil engineering associates. The designed ultimate capacity of the station is 123,000 kW comprising four 30,000-kW main sets and a 3,000-kW house service set. The installation is actually being provided in two sections, each with two main sets. The civil and building construction work for the second section is also now well advanced, and it appears that there will not be a great interval of time between the completion of the two sections. We, therefore, propose to describe the complete station from the constructional aspect.

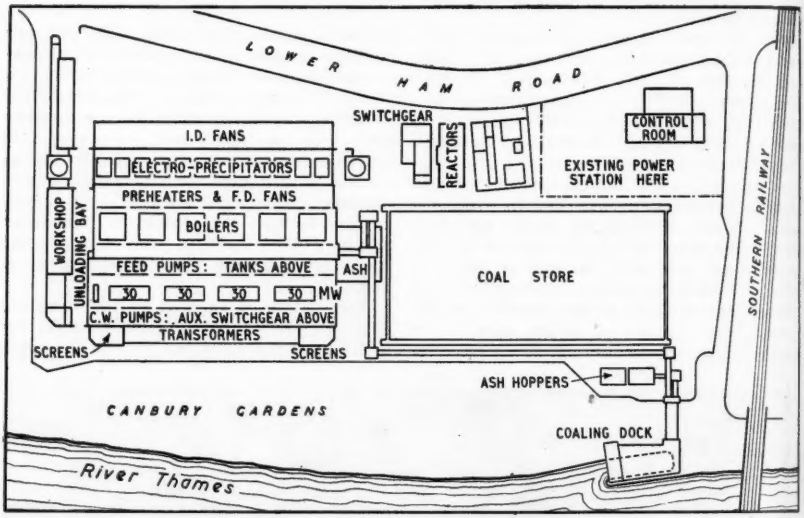
The station is situated in the Kingston Borough area, on the east bank of the Thames which, near this point, has a north and south



Main turbo-alternators are aligned end on ; high-pressure rotor for near set in distance ; feed and tank bay on right

course. It is near the old Kingston power station and on the site of the original Kingston sewage works. The site is just north of the Kingston railway bridge, and hence of the Southern Region ring line—Kingston, Teddington and Richmond. To the west of the station site lie the popular Canbury Gardens, but the buildings and the outworks will not seriously obtrude on the amenities of the river bank. The site is roughly rectangular in shape, and it occupies about 12½ acres. From north to south it is about 350 yd (320 m) long. The old power station is in the south-east corner of the site.

The coal storage ground, which will accommodate about 25,000 tons at 20 ft



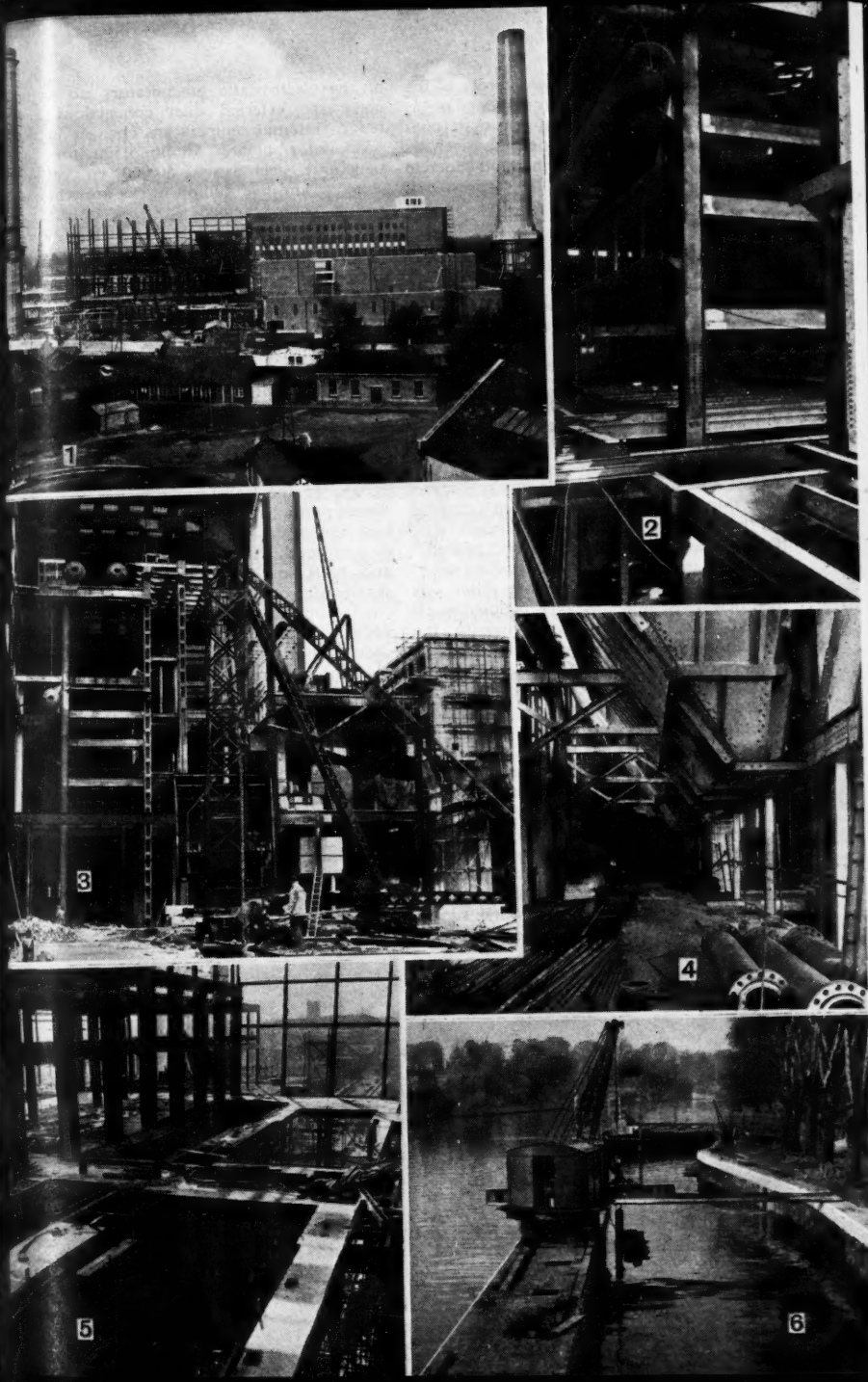
Kingston power station site is about 12½ acres

(18 m) deep, occupies the south-west quarter. The main building block comprising the boiler and turbine houses, and accommodation for the associated plant, extends over nearly half the total length of the site, the turbine house being on the river side. Towards the east side of this block are the two chimneys, one at each of the north and south ends of the boiler plant buildings. In the area east of the coal store and between the old and new stations are the existing 33-kV switch house and C.E.B. transformer compound. New switch and reactor houses are being built immediately north of the existing switch house.

Because of the arrangements already in existence for the control of the switchgear associated with the old power station and the grid, the existing control room in the old station is being extended to make provision for the control of the new switchgear. In consequence of this rather dispersed electrical system a full man-height reinforced-concrete fan-ventilated cable subway has been constructed, running the whole length of the new station adjacent to the circulating-water culverts, and thence to the distant 33-kV control room, with branches into the 33-kV switch houses.

Because the station is dependent on water-borne coal, a large covered dock for loading and unloading has been constructed on the

(See opposite page.) (1) Civil work is already well advanced at the south end of the main building block. (2) Work is being started on the stokers and combustion chambers ; circulatory system and bottom drum at top. (3) Tri-drum boilers.—Left to right : Boiler, economiser, air preheater, precipitation buildings. (4) Near the bottoms of the bunkers are the main steam receivers. (5) This shows the operation floor level of section C. (6) At the south-west corner of the site a dock will receive 250-ton barges ; condensing water inlet construction in rear


1
2
3
4
5
6

river bank near the south-west corner of the site to accommodate 250-ton barges.

The station will take and return its condenser circulating water from the river by rectangular underground reinforced-concrete culverts. The inlet and outlet are roughly opposite the south and north ends of the main buildings, respectively, and bell mouths at the river edge reduce the flow velocities. Kingston is situated up-stream of Teddington Weir, so that the river at this point is normally non-tidal. Generally the flow to and from the station is the same as that of the river, south to north, but by means of electrically operated penstocks and valves it is possible periodically to reverse the flow so that the risk of undue accumulation of silt is minimized.

The general ground level of the site is about 21 ft (6·4 m) O.D., and owing to the configuration of the land east of the river the standing water level is not much lower than this figure. The whole area occupied by the main buildings and chimneys was, therefore, at the outset enclosed or " tanked " to a depth of 20 ft (6 m) by interlocked sheet-steel piling. The area within the piling was then dewatered and the constructional work carried out in dry soil. Generally the foundations are carried on ballast, but in some cases these are taken down to blue clay level. In certain parts of the site outside the tanked area concrete piling has been resorted to.

The station buildings are of steel-frame brick-case construction and are architecturally designed to " match " the surroundings. The 250-ft (75 m) high chimneys are of reinforced concrete in multi-sided form, with brickwork base enclosures, reconstructed stone plinths and internal acid-resisting brick linings. On the east side of the station an independent steel-framed brickwork screen wall has been constructed to the full height of the electrostatic precipitators, so as to mask the external duct connections and reduce internal temperature changes in the precipitator plant. About 5,500 tons of structural steel work, 50,000 cu yds of concrete and five million bricks are required for the whole scheme.

The main block is about 430 ft (129 m) long north to south, and 320 ft (96 m) wide. The buildings rise from a general basement level throughout both the turbine and boiler houses of 17·5 ft. (5·3 m) O.D., i.e., 3·5 ft (1·1 m) below the general site level. The general operation floor level throughout is 40 ft (12 m) O.D. On the west side above the culverts is the transformer bay which is 23 ft (6·9 m) wide and at a floor level 24 ft (7·2 m) O.D. At each end of this bay is a screen house incorporated in the condensing water system.

Next to the transformer bay is the condenser pump bay, which is 26 ft (7·8 m) wide and houses the pump motors at the 17·5-ft (5·3 m) level. In the same bay at the 40-ft and 53-ft levels are cable and auxiliary switchgear rooms, respectively. Next to the c.w. pump bay is the turbine house proper, which is 370 ft (111 m) long, 50 ft (15 m) wide, with a roof level at 85 ft (25 m) O.D. The turbines are installed at the 40-ft level, and the condensers, etc., below at the 17·5-ft level, while at a rail height of 24 ft above the operating-floor level is installed an 85-ton Sir William Arrol crane. East of, but opening on to, the turbine room proper is a feed-pump bay which is 24 ft wide. The feed pumps are located at the 40-ft level, but in the same bay at the 63-ft level are the condensate surge and filtered-water tanks which are covered in but are in that portion

General basement level is at 17·5 ft O.D.; boiler basement seen in rear between condensers of Nos. 1 and 2 sets

of the bay which opens on to the turbine room interior. Further up at the 80-ft or roof level are raw- and softened-water tanks exposed to the atmosphere.

The main boiler house structure is about the same length as the turbine house and 76 ft (23 m) high internally. The first 20 ft (6 m) of its width, however, constitutes the coal-bunker bay which rises to a level of 122·5 ft (37 m) O.D. The level at the top of the bunkers is 108 ft (32 m) O.D., and immediately above this are the enclosed conveyors of the coal-handling system. The bottoms of the bunkers are at about the 78-ft (23 m) O.D. level, and the coal enters the inclined boiler chutes at about the 65-ft (20 m) level. The bunkers are gunite lined and there is one bunker per boiler. Also in this bunker bay at the 69 ft (21 m) level are the main steam receivers. The boiler house proper is 56 ft (17 m) wide and its highest roof level is about 121 ft (36 m) O.D.

The upper drum level at the centres is about 50 ft (15 m), and the centre of the bottom drum is at about the 23-ft level. The firing aisle is about 20 ft (6 m) wide, extending into the bunker bay, and the boiler extends east to about 34 ft (10 m) from the front of the stokers. Immediately behind the boiler in a structure about 8 ft wide are the economizers. Next come the forced draught fans and the air-preheater bay, which is 31 ft (9 m) wide, the fans being installed at the basement level (17·5 ft) and the air preheaters at the operation level (40 ft). East of the f.d. fans and preheaters is the precipitation plant in an open-top bay 53 ft (16 m) wide. The precipitation chambers proper rise to a level of about 68 ft (20 m) O.D. from the operation floor level, and they are surmounted by chambers about 8 ft (2·4 m) high which accommodate

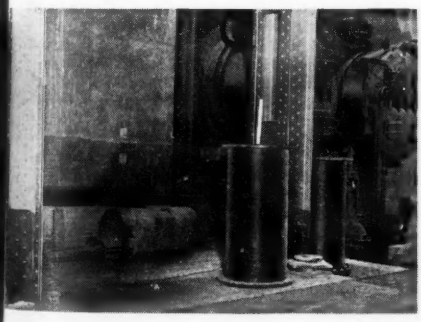
Preheaters are at the operation level

the high-voltage equipment for supplying the precipitation plant proper. Suspended in the basement chambers under the precipitators are soot-collecting hoppers.

Finally, on the extreme east, there is the 40-ft wide induced-draught fan bay in which the fans are situated at the 21-ft level or slightly higher than the general basement level. Most of the above bays are served by cranes or runways. All the building and civil engineering work is being carried out by Charles Brand & Sons, Ltd.

The six 265,000-lb (120,000 kg) per hour boilers are arranged in a single line running north and south at 60-ft (18 m) centres. They are Stirling tri-drum units with horizontal self-draining superheaters, water-cooled Bailey block furnace walls, and twin Babcock & Wilcox chain-grate stokers. The economizers are Senior gilled-tube equipments, and the air preheaters are vertical-spindle Howden-Ljungström units. All the fans are of James Howden manufacture and the electrostatic precipitation plant is by Lodge Cotterell. There are twelve precipitator units, i.e., two per boiler.

Provision has been made for the possible future installation of gas-washing plant, should this prove necessary, and for this purpose the i.d. fan house roof has been specially reinforced. The main flue to the chimneys from the i.d. fan plant is situated on the preheater bay at the 64-ft (19 m) level, and it runs the whole length of the



building from chimney to chimney. Unit boiler control boards are provided for at the 40-ft (12 m) level.

The Fraser & Chalmers coal-handling installation incorporates a telpher grab equipment in the crane house over the barge dock, and a system of belt conveyors above an enclosed arch over Canbury Gardens, with a main run along the west side of the coal store and up to the boiler-house bunkers. For distribution and reclaiming, the coal store is spanned by a transporter bridge carrying discharging belts and chutes and two reclaiming jib cranes. Ash handling is by the Babcock & Wilcox "Hydrojet" system by which ash and grits are sluiced down to an ash house at the south end of the boiler house where the ash and clinker pass through crushers and ash pumps, and then on to drainage bunkers from which the solid matter is belt conveyed to the barge dock, while the water is recirculated.

The four B.T.H. 30,000-kW turbo-alternator sets are arranged end-on in line, with the steam ends of each pair (north and south) facing each other, to facilitate operation and to suit the pipe-work lay-out. The turbines are two-cylinder multi-stage impulse-reaction machines, with duplex exhaust and Worthington Simpson twin condensers. Two Mirrlees-Watson double-axial flow single-stage circulating pumps serve each turbine set, one per condenser. Five-stage feed heating is adopted and the high-pressure heaters are arranged in line with the Mather & Platt feed pumps at the 40-ft level. The feed system includes unit evaporators, one for each turbine, and a central live-steam evaporator for surge-tank make-up. All the pipework is of Stewart & Lloyds' production. The alternators generate at 11-kV and are directly connected to Hackbridge transformers which step up to 33 kV, at which voltage the switching is effected by Ferguson, Pailin oil circuit breakers.

The larger station auxiliaries are driven by 3·3-kV motors and the smaller ones by 400-V motors, and the supplies for all of these are handled by English Electric air-break and contactor switchgear. The main cables are of B.I. Callender production.

We are indebted to Mr. E. J. Jarvis, borough electrical engineer, Kingston, for permission to view the station.

Labour Relations in the Supply Industry

Electrical Housecraft Advisers' Position

THE position of electrical housecraft advisers when the electricity supply industry is nationalized on 1st April was clarified last week by Mr. E. W. Bussey, member of the British Electricity Authority, who is dealing with the matter of labour relationships. Introducing Mr. Bussey at a meeting of the Electrical Association for Women, Dame Caroline Haslett, its director, who is also a member of the B.E.A., said there was no clear-cut policy with regard to electrical housecraft advisers.

After outlining the development and functions of the Joint Industrial Councils, Area Councils, Works Councils, Staff Committees, the Industrial Court, and the National Arbitration Tribunal, Mr. Bussey stated that almost all the gaps in the structure of negotiating machinery in the industry had now been filled or would be by Vesting Day. The majority of the 23,000 clerical and administrative workers were now organized, as were also the chief officer grades.

The J.I.C. machinery had worked extremely well in the industry with regard to wages, but, due to its preoccupation in this direction, its work in connection with education and training had been very patchy. The B.E.A. was aiming at continuing the existing arrangements and extending them right down to the workshops and local levels. The B.E.A. would not forget that there was a place in the scheme for demonstrators and he looked forward to co-operation with the E.A.W. to ensure that there was adequate machinery for their recognition. The reduction of the number of supply authorities from 500 to 14 would simplify the problem of organization. It was better to be a part of a large body than a small one and there was a tendency as an industry became highly developed for the number of organizations to be reduced. It was to the advantage of electrical housecraft advisers to get their representation as complete as possible.

Miss M. G. Gosse, chairman of the Association of Electrical Housecraft Advisers, thanking Mr. Bussey for his address, said that N.A.L.G.O. had stipulated a 60 per cent representation of electrical housecraft advisers before it would agree to negotiate for them.

At a well-attended meeting of the Association of Electrical Housecraft Advisers held previously Miss Gosse appealed to all housecraft advisers engaged in the industry to join the Association; otherwise they would be unable to represent the interests of the women in the industry in negotiations with the B.E.A. Inquiries should be addressed to the hon. secretary at 133, Sussex Way, Cockfosters, Herts.

Further Electricity Appointments

First Divisional Positions Filled

THE **British Electricity Authority** announces the appointment of Mr. C. J. Hornsby, assistant secretary to the Electricity Commission since 1945, as *assistant secretary* to the Authority.

The following further appointments are announced by the **South Eastern Electricity Board:**—*Chief commercial officer*, Mr. C. F. Wells, M.I.E.E. (Yorkshire Electric Power Co.); *deputy secretary*, Mr. G. Wray, O.B.E. (assistant secretary, Institute of Municipal Treasurers and Accountants); *surveyor*, Mr. R. E. J. Harding (London and Home Counties J.E.A.); *chief draughtsman*, Mr. P. R. Harries (County of London E.S. Co.); *Accounting Section* (*Headquarters*), Mr. S. J. F. Jewiss (London and Home Counties J.E.A.).

Section Heads: Engineering: Messrs. D. C. Field, B.A., M.I.E.E., A.M.Inst.C.E. (Wessex Electricity Co.) and Mr. C. Freeland, A.M.I.E.E. (County of London E.S. Co.,); *Secretarial:* Messrs. S. D. Brown (London J.E.A.) and Mr. L. W. Goodman (London J.E.A.).

Northern Sub-Area: *secretary*, Mr. F. G. Beeby (Croydon Electricity Department); *accountant*, Mr. F. G. Cracknell (Croydon Electricity Department). South-Eastern Sub-Area: *Secretary*, Mr. F. S. Jones, A.C.I.S. (Eastbourne Electricity Department); *accountant*, Mr. E. S. Patterson, A.I.M.T.A. (Borough Treasurer's Department, Hastings). South Western Sub-Area; *Secretary*, Mr. S. L. Robinson, A.C.I.S. (Brighton Electricity Department); *accountant*, Mr. F. W. Shaw, A.I.M.T.A. (Brighton Borough Treasurer's Department); *senior officer* (*internal audit*): Mr. R. Crossland, A.I.M.T.A. (private practice). Eastern Sub-Area: *Secretary*, Mr. H. E. Silk, A.S.A.A. (Kent Electric Power Co.); *accountant*, Mr. W. F. Barker, C.A. (London J.E.A.). Western Sub-Area: *Secretary*, Mr. D. A. Green, A.C.I.S. (Electric Supply Corporation); *senior officer* (*internal audit*), Mr. J. McTaggart (London J.E.A.).

East Midlands Electricity Board.—*Sub-area managers:*—Derbyshire and Nottinghamshire (No. 1), Ilkeston—Mr. J. N. Robertson, M.I.E.E. (manager, Derby & Notts Electric Power Co.); Lincolnshire (No. 2), Grantham—Mr. F. Newey, M.I.E.E. (engineer and manager, Lincoln Corporation Electricity Dept.); Leicestershire and Warwickshire (No. 3), Hinckley, Leics.—Mr. W. F. Weston, A.M.I.E.E. (manager, Leicestershire & Warwickshire Electric Power Co.); Northamptonshire (No. 4), Northampton—Mr. E. G. H. Jackson, B.Sc., A.M.I.E.E. (general manager and engineer, Northampton E.L. & Power Co., Ltd.); Derby (No. 5)—Mr. F. H. Pooles, M.I.E.E. (chief engineer and general manager, Derby Corporation Electricity Dept.); Nottingham (No. 6)—Mr. M. Wadeson, M.I.E.E. (city electrical engineer and general manager, Nottingham Corporation); Leicester (No. 7)—Mr. D. H. Parry, B.Sc., A.M.I.E.E. (borough electrical engineer, Leicester Corporation Electricity Dept.); Coventry (No. 8)—Mr. F. W. Godden, M.I.E.E. (engineer and manager, Coventry Corporation Electricity Dept.); Burton and District (No. 9), Burton-upon-Trent—Mr. F. Overstall, M.I.E.E. (borough electrical engineer, Burton-upon-Trent).

North Western Electricity Board.—*Electro-technical engineer*, Mr. J. L. Carr, M.Sc., M.I.E.E. (distribution engineer, Manchester Corporation Electricity Department); *senior section head* (*accountancy*), Mr. K. C. Thompson (Bury Corporation); *section heads* (*accountancy*), Messrs. A. D. Compston (C.E.B.), F. Hogan (Lancashire Electric Power Co.), N. G. Smith (Stretford Corporation) and J. Tiffin (Salford Corporation); *sub-area accountant, Manchester*, Mr. R. J. Norris (Manchester Corporation).

South Wales Electricity Board.—*Sub-area managers:*—Mr. H. E. Blackiston, M.I.Mech.E., M.I.E.E. (Swansea Borough Electricity Dept.), Mr. A. J. Channing (Cardiff Corporation Electricity Dept.), Mr. E. W. Jones (Mountain Ash U.D.C. Electricity Dept.) and Mr. C. L. Townsend (West Cambrian Power Co., Ltd.) The Board has also appointed Mr. W. Hyland, M.Sc.Tech., A.M.I.E.E., A.M.I.Mech.E. (Cardiff Corporation Electricity Dept.), as *purchasing officer* at the head office, St. Mellons, near Cardiff.

Midlands Electricity Board.—*Sub-area manager* (*Birmingham and District*). Mr. A. C. Evans, secretary of the Birmingham Electric Supply Department since 1936.

Division Announcements

South Wales Division.—The following have been invited to serve in the positions named:—*Chief generation engineer* (*operation*): Mr. E. H. Jones, M.I.Mech.E., A.M.I.E.E. (deputy borough electrical engineer, Swansea); *generation engineers* (*operation*): West District, Mr. R. L. Axford, A.M.I.Mech.E. (deputy borough electrical engineer, Newport, Mon.) and East District, Mr. C. H. Bulman, A.M.I.E.E., A.M.I.Mech.E. (deputy city electrical engineer, Cardiff); *generation engineer* (*construction*): Mr. T. H. Wood, M.I.Mech.E., A.M.I.E.E. (borough electrical engineer and manager, Newport); *transmission engineer:* Mr. C. M. New, A.M.I.E.E. (section engineer, C.E.B., Bristol); *technical engineer:* Mr. G. Minter, A.M.I.E.E. (assistant technical engineer,

C.E.B., Bristol); and *divisional accountant:* Mr. D. S. Chisholm, A.S.A.A. (assistant accountant, C.E.B., Bristol).

London Division.—The following appointments have so far been made:—*Chief engineer generation (construction):* Mr. A. Pollitt; *chief engineer generation (operation):* Mr. H. J. Bennett; *system operation engineer:* Mr. J. G. Bentley; *transmission engineer:* Mr. B. Farnworth; *technical engineer,* Mr. J. Williams; *divisional accountant:* Mr. H. R. Hornby; and *divisional secretary:* Mr. B. Higgins.

Eastern Division.—*Chief operation engineer:* Mr. A. C. Thirtle (city electrical engineer, Carlisle). *Chief generation engineer (construction):* Mr. T. Yule (deputy engineer and manager, Brighton). *Generation engineers (operation):* Mr. L. W. Stretton (power station superintendent, Brimsdown) and Mr. F. A. Hayward (station superintendent, Little Barford). *Generation engineer (construction):* Mr. R. R. Maddock (Northmet Power Co.). *Technical engineer:* Mr. W. Casson (C.E.B.). *Accountant:* Mr. H. G. Penniket (C.E.B.). *Transmission engineer:* Mr. M. I. Barstow (C.E.B.).

Division of Electricity Areas

Yorkshire, Eastern and North Eastern

PARTICULARS have been received of the division of further Electricity Areas as follows:—

Yorkshire Area (chairman, Mr. W. M. Lapper):—*No.* 1 (*Bradford*).—Bradford, Ilkley, Barnoldswick, Earby, Skipton, Pudsey, Shipley, Keighley, Bingley, Craven and Electrical Distribution of Yorkshire (part). *No.* 2 (*Huddersfield*).—Huddersfield, Halifax, Todmorden, Mirfield, Holmforth, Hebdenroyd, Coln Valley, Spenborough, Heckmondwike, Brighouse, Elland and E.D.Y. (part). *No.* 3 (*Sheffield*).—Sheffield, Rotherham, Mexborough and E.D.Y. *No.* 4 (*Leeds*).—Leeds, Morley, Tadcaster and E.D.Y. *No.* 5 (*Doncaster*).—Doncaster, Adwick, Barnsley, Wakefield, Dewsbury, Batley, Dearne, Normanton, Pontefract, Castleford and E.D.Y. *No.* 6 (*Hull*).—Hull, Bridlington, Buckrose, S.E. Yorks, and N. Lincs and Howdenshire. *No.* 7 (*Grimsby*).—Grimsby, Cleethorpes, Louth, Scunthorpe, Gainsborough and Yorkshire Electric Power Co.

Eastern Area (chairman, Mr. C. T. Melling):—*No.* 1.—Bedford, Luton, Aylesbury, Chesham Co., Watford, Colne Valley Co. and Northwood Co. *No.* 2.—First Garden City Co., Hitchin, Northmet Co., Welwyn Co., Hornsey and Finchley. *No.* 3.—County of London Co., Brentford Co., Wickford Co., Tilbury and Southend. *No.* 4.—Wisbech, Peterborough, Beds., Cambs and Hunts. Co., Cambridge Co., and Newmarket Co. *No.* 5.—Norwich, King's Lynn, East Dereham, Great Yarmouth, Lowestoft and Bungay. *No.* 6.—East Anglian Co., Ipswich, East Suffolk, Aldeburgh, Felixstowe, Harwich, Colchester, Clacton and Frinton Co.

North Eastern Area (chairman, Mr. H. H. Mullens):—*No.* 1 (*Tyne*).—Alnwick, Morpeth, Blyth, Newcastle and Hexham. *No.* 2 (*Wear*).—Sunderland and Durham. *No.* 3 (*Tees*).—Darlington and Middlesbrough. *No.* 4 (*Harrogate*).—Harrogate, Richmond, Northallerton, Thirsk, Ripon and Boroughbridge. *No.* 5 (*York*).—York, Whitby, Scarborough and Malton.

Radio Components Show

THE fifth annual exhibition of the Radio Components Manufacturers' Federation held at Grosvenor House last week was opened by Mr. J. H. Jones, M.P., Parliamentary Secretary to the Ministry of Supply. Sir Robert Renwick, president of the R.C.M.F., referred to the size and importance of the British radio industry and its increasing export trade and said that it was destined to play a leading role in the future economics of the country. The primary object of the exhibition was to acquaint radio engineers, manufacturers and research technicians in all parts of the world with the latest advances in the design of components and materials, and there were 102 exhibitors as compared with ninety-three last year. The exhibits came under nearly 200 different categories ranging from the miniatures used in deaf-aid appliances and aircraft radio to the large components for high-powered broadcast communication transmitters, electro-medical apparatus and navigational aids. Among the other interesting exhibits were a wide range of instruments, miniature mouldings and castings, magnetic materials, alloys, insulants, metallized ceramic and glass for hermetically sealing components, cables and connectors for radar equipment.

Standard Specifications for Palestine

STANDARD specifications for the electrical industry are now in course of preparation in Palestine. They refer mainly to electrical appliances for domestic use, but more general items such as cables, installation materials and accumulators have also been covered. The Standards Institution of Palestine has also embarked on the preparation of regulations, codes, recommendations and model contracts. Under an agreement reached between the Institution and the two electricity corporations operating in Palestine no appliances for domestic use are connected to the mains unless they have been approved by the Institution. Cookers, boiling plates, water heaters, wash boilers, fires and coffee percolators are involved at present. It has been the policy of the Institution to follow British Standards practice as closely as possible, and British-made apparatus is exempted from testing in Palestine if proof of its compliance with B.S.S. requirements is furnished.

PERSONAL and SOCIAL

News of Men and Women of the Industry

THE Secretary of State for Scotland has appointed **Mr. J. W. McKillop** to be a member of the Amenity Committee under the Hydro-Electric Development Act.

Mr. L. H. Short, M.C., M.I.E.E., M.Inst.T., has been appointed chief of administration of the Traction Department of the English Electric Co., Ltd., to co-ordinate the company's interests in the fields of railway and road transport. Mr. Short is a director of the English Electric Export & Trading Co., and a member of the management board of the parent company. After the 1914–18 war, during which he served in the 7th Batt. Durham Light Infantry, and in the R.F.C. and R.A.F. as a captain and flight commander and was awarded the Military Cross, he obtained a first class diploma at Faraday House and in 1922 joined the English Electric Co. as a pupil apprentice. He first specialized in the electrification of railways, and from 1927 to 1929 was resident engineer for the company's electrification contracts on the Great Indian Peninsula Railway, Bombay. Returning to England, he was appointed deputy manager and chief engineer of the Traction Department. He made extensive tours in the British Empire and foreign countries. In 1940–41 he visited South America, as a member of the Willingdon Mission, reporting on electrical industries in the countries visited, and in 1943 he went to Portugal where he initiated the negotiations which have resulted in hydro-electric contracts for work in which the English Electric Co. and Metropolitan-Vickers are jointly interested.

Mr. L. H. Short

Mr. H. H. Swift has been appointed acting electrical engineer, Eastern and North Eastern Regions, British Railways.

Mr. H. P. Barker has been elected chairman of Measurement, Ltd., one of the companies of the group of Parkinson & Cowan, Ltd., of which he is managing director.

Mr. M. W. Shorter has been appointed sales manager of the Westinghouse Brake & Signal Co., Ltd.; **Mr. C. Sprang,** deputy sales manager; and **Mr. H. J. Willett,** assistant sales manager (Rectifier Department).

Mr. R. H. Howatt has been appointed sales manager, Steam Turbine Department, English Electric Co., Ltd. He joined the company in January, 1946, as deputy to Mr. J. T. Moore, who, as already announced, has been appointed chief engineer of the company. Mr. Howatt was previously sales and contracts manager, Turbine Department, Brush Electrical Engineering Co., Ltd., and previously was with James Howden & Co., Ltd.

Mr. E. B. Hill (Charles Hill & Co., Ltd.) has been elected chairman of the Zinc Alloy Die Casters Association for 1948.

Mr. V. H. F. Hopkins, M.I.Mech.E., M.S.A.E., has been appointed general Diesel sales manager of C.A.V., Ltd. He has taken over responsibility for the mechanical engineering and oil engine equipment sales organization of the company covering all combustion engine applications at home and overseas. **Mr. J. C. H. Lovelock,** M.I.Mech.E., formerly technical representative, has been appointed service manager.

Mr. N. Shackleton, Middlesbrough, has been appointed consumers' engineer in the West Hartlepool Corporation Electricity Department.

Mr. J. Taylor, A.M.I.E.E., who as reported in our last issue has been appointed deputy electrical engineer and manager to the Scunthorpe Corporation Electricity Department, began his career as a pupil of Mr. P. P. Wheelwright, engineer and manager at Blackburn. Subsequently he served with the Walsall, Sheffield and Cleethorpes undertakings before becoming chief technical assistant at Scunthorpe in March last year.

Mr. K. W. Finch, deputy borough electrical engineer and manager at Cheltenham, has been appointed acting engineer and manager in view of **Mr. R. W. Steel's** appointment as chief commercial officer of the South Western Electricity Board.

Mr. H. W. Barber, J.P., district manager for Johnson & Phillips, Ltd., Manchester, has been elected an alderman for the County Borough of Southport. Alderman Barber has been twice Mayor of the borough, and is chairman of the Finance Committee and the leader of the Town Council.

Mr. W. B. Bradley, commercial assistant, Ashton-under-Lyne Corporation Electricity Department, retires on 31st March after forty years' service.

Mr. T. W. Hibbert, electrical engineer at Doncaster for the past twenty years, is retiring at the end of March. Previously he was with the Barnsley Corporation undertaking.

Alderman A. Hewitt, for twenty-five years chairman of the North Wales and South Cheshire Joint Electricity Authority, was presented with a gold wristlet watch as a mark

of esteem from members of the Authority, at a luncheon which followed the final meeting held at Llandudno.

Mr. C. Bradley, M.I.E.E., has been appointed general manager and engineer with the Finchley Corporation Electricity Department in succession to **Mr. C. R. Westlake,** M.I.E.E., who as previously reported, has been appointed chairman of the Uganda Electricity Board. Mr. Bradley has held the appointment of acting general manager on three occasions during Mr. Westlake's absences abroad.

Mr. A. O. Cosgrove, B.Sc., M.I.E.E., has been appointed chief engineer to the Uganda Electricity Board. For twenty years he held the appointment of Government electrical engineer of Kenya.

Mr. M. Preston has resigned from the board of Stonor Electrical Wholesalers, Ltd.

Dr. M. Reed, Ph.D., M.Sc., M.I.E.E., has been appointed chief radio engineer at Philips Mitcham Works. From 1929 to 1946 he was with Siemens Bros. & Co., Ltd., occupying successively the positions of head of the wireless laboratory, chief radio engineer and assistant to the chief engineer, Telecommunications Department. Before joining the Mitcham organization he was for a short time general manager of R.F. Equipment, Ltd.

Mr. G. R. J. Harris has been appointed information officer to the Radio and Television Trust group of companies.

Obituary

Mr. C. W. Ritchie.—We regret to record the death on 25th February, after a short illness, of Mr. Charles W. Ritchie, A.M.I.E.E. Mr. Ritchie, who was fifty-six, joined the Ferranti staff in 1913 and had for many years been widely known as a sales engineer of the Instrument Department. The funeral took place on 1st March, at the Manchester Crematorium, in the presence of a large number of friends, including representatives of Ferranti, Ltd.

Mr. C. R. Ramsay, who founded the electrical contracting firm of Ramsay & Son, South Shields, twenty-five years ago, died recently in hospital after a long illness. He was seventy-six and retired five years ago.

Mr. H. Clarke, chief electrical and mechanical engineer at Catterick Camp, Yorkshire, for twenty-five years, died recently at the age of sixty-two.

Mr. P. H. I. Humphreys.—The death occurred at East Twickenham on 7th March at the age of sixty-one of Mr. Percy Harry Illingworth Humphreys, O.B.E., M.I.C.E., M.I.Mech.E., M.I.E.E., lately captain, Royal Engineers.

Will.—Mr. P. D. Tuckett, director of British Electric Traction Co., Ltd., City of London Electric Lighting Co., Ltd., Bankside Investment Trust and other companies, left £219,090 (net personalty £157,104).

Birmingham Electric Club

THE importance of maintaining good relationships within the electricity supply industry after nationalization was stressed at the annual reunion and concert of the Birmingham Electric Club at the Grand Hotel, Birmingham, last Friday. Proposing the toast of "The Club," Mr. J. J. Gracie, works manager, General Electric Co., Ltd., Witton, declared that fellowship was never greater in the industry than now. The future peace of the world depended on engineers and he wondered whether the right things were being nationalized. Atomic energy was being nationalized; why should not all explosives and destructive things so that the Government could have the sole responsibility for maintaining peace? The role of engineers was a constructive one and they should work in harmony. Replying to the toast, Mr. N. M. Hill, the president, said that the only way the country could maintain its standard of living was by developing Empire resources.

Alderman W. S. Lewis, member of the British Electricity Authority and chairman of the Midland Area Electricity Board, said it would be one of the greatest tragedies possible if the goodwill that now existed within the industry were destroyed. He hoped that under nationalization personal contacts with the consumer would be maintained; for the consumer came first. Nationalization was not such a great step forward as some people seemed to think. The industry had been 75 per cent nationalized since 1926 and it was now time for another step forward. Their object was to make electricity as widely available as possible. He had never been able to understand why the agricultural worker should have to pay more than the consumer in the urban areas. Mr. W. Balmford, vice-president of the Club, also spoke.

Measurement of Water Movement

THE various means available for the measurement of water pressure and flow in the vicinity of model or full scale ships in motion are discussed in a paper prepared by Dr. E. G. Richardson and read before the North East Coast Institution of Engineers and Shipbuilders at Newcastle last Friday. The calibration and sensitivity of two types of recorder, the hot wire for velocity and the aneroid for pressure, are described in detail, and consideration is given to the conditions which must be fulfilled when they are required to follow fluctuating motions. Practical examples are given of the application of the hot wire velocimeter, to models in a towing tank, both for recording mean velocities set up by the general motion of the ship and the microturbulence set up by its vibration. A means of measuring and recording the flow through a screw propeller is also described.

Domestic Heating

Use of Load-Limiting Relay

By E. M. Ackery, A.F.C., B.Sc.

THE incidence of cold weather and load shedding shows very clearly the effect of the electric fire on maximum demand and indicates at the same time that domestic space heating is apt to have a disappointingly low diversity factor. In sheer size, the potential load is impressive. There are about twelve million homes in the country and even if only 1 kW is allowed for each, the heating load would be larger than the present grid maximum demand. If all these twelve million homes were adequately heated to Egerton Report standards, the demand would be about 6 kW per house, and as space heating of this character has little or no diversity, the domestic heating load would require about 72 million kVA of generating capacity, more than that used for other purposes.

A large slice of the domestic heating load is, and is likely to be, of the emergency variety that only comes on when it is really cold and when the supply industry wants it least. Nor can the conclusion be escaped that it is an uneconomic load to the supply industry, although from the householder's point of view it is highly economical and convenient. The central-heating industry apparently considers it reasonable to design heating installations to cope with external temperatures of 30 deg F, leaving the doubtful privilege of making conditions endurable in really cold weather to the electricity and gas supply industries. Electricity supply authorities having large numbers of centrally heated buildings in their areas are well aware of what this means and if district heating becomes general, trouble may well become widespread. The refrain "electric or gas fires will be used in extreme weather" occurs in the account of nearly every projected district heating scheme.

This "snap" heating load should be clearly differentiated from "background" heating as defined in the Egerton Report. The correctly designed and operated background heating system will give no more than the required background temperature whenever this temperature is higher than outside. As a result "topping-up", for which electric fires are particularly suitable, is required more or less throughout the whole of the winter season. This topping-up load will have a reasonable load factor and is not in the same category as "snap" heating.

All electricity supply problems must be viewed from at least two angles, that of the supply authority and that of the consumer. The supply authority wishes to get adequate payment for its service to its consumers and, consequently, the domestic heating load must pay its way. Although a certain amount of uneconomic load can be borne by an undertaking, the size of the domestic heating load is already rapidly overstepping this limit.

The consumer wants to obtain electricity at a reasonable price and to be able to use it freely when and for what purpose he wishes.

These two rather different needs cannot both be completely satisfied. As the aspect of the load paying its own way admits of no compromise, the problem resolves itself into one of deciding how this can be achieved with the minimum of inconvenience to the consumer.

A separate domestic space-heating charge would involve the abandonment of the two-part tariff with all its advantages and would mean a large expense for rewiring in most houses. In any case such a charge, if high enough to deal with the "snap"-heating consumer, would cripple more legitimate space-heating developments. An increase in the running charge of the domestic two-part tariff is even less desirable, as this would have an adverse effect upon all electrical development. The idea of a two-part tariff based upon a measured maximum demand is attractive at first sight but in practice it bristles with difficulties. The cost of the equipment, the difficulty of dealing with the unfortunate consumer who has a spot of bad luck and clocks up about 10 kW on the meter and the fact that it is only the load during the undertaking's maximum demand period that really matters to the consumer are all against this way out.

What is really needed is for the consumer himself to limit his demand during the critical periods and to be free at other times to use as much electricity as he cares to pay for. Or in other words, the consumer should be gently but firmly compelled to do what he is now being exhorted to do of his own free will by all the devices of modern publicity.

The system visualized by the writer would

be for the existing domestic two-part tariff to remain as it is, provided it is a reasonable one, but for the standing charge to entitle the consumer to a limited and fixed demand on the supply mains during critical periods. This would entail a load-limiting relay on the consumer's premises that would be put into operation by the supply authority during critical periods only through the medium of some form of remote control. The relay might and, indeed, would preferably, be fitted with a warning device and would be resettable by the consumer so that during any critical period, as determined by the supply authority, so much load but no more could be taken by the consumer. If this load were exceeded all supplies to the household would be switched off, but the supply could be restored by a reduction of the load to within the limit and, most important, the consumer would decide himself what kind of a load he would have: whether his x kW would be in space heating, cooking, lighting or water heating.

This system would cause the consumer some inconvenience, but it would not happen often; it would not deprive him of all supply and it would not interfere with his maximum use of electricity for all purposes at other times. After all, it would not take long for the ordinary consumer to learn what he could leave switched on without risk of a cut-off once the warning was given and for all but the careless consumer, " cuts " would be non-existent. It might well be described as " restriction without tears."

Should a consumer wish to be free of all risk of a cut he would be permitted to have his relay set at a higher figure by paying an increase in his standing charge based on the increased load he desired.

From the supply industry's point of view, such a system would enable the domestic load to be reduced to a known figure at will and from the national point of view would render unnecessary expenditure on generating plant to be used only for a few hours a year. Suitable figures for converting standing charges into kilowatts and load and for the price to be paid for extra load could be readily settled to the mutual satisfaction of both undertaking and consumer.

NEW BOOKS

Steam Utilization in Factories. Refrigerator Principles.

The Efficient Use of Steam. By Oliver Lyle. Pp. 912; figs. 438. H.M. Stationery Office, Kingsway, London, W.C.2. Price 15s.

This work has been written for the Fuel Efficiency Committee of the Ministry of Fuel and Power as a companion to " The Efficient Use of Fuel," published in 1944. Intended as a practical manual for factory steam users, the book is clearly written and the treatment simplified by worked-out examples, giving costs where relevant, so that its material features should not be above the heads of those whose technical knowledge is elementary. The eighty-one tables include steam tables based on Callendar's (1939) but conveniently calculated to gauge pressures.

The first three of the twenty-six chapters deal with the properties of steam, under which heading comes the topical subject of combined power and heating with explanations of the spheres of pass-out and back-pressure turbines. These are followed by fifteen chapters on efficient distribution and use of steam, which are likewise packed with essential information logically arranged. After a chapter on automatic controls comes one of more than 100 pages on heat balance, which is enriched by numerous industrial examples, and others on costing and regression (without advanced mathematics), the use of economizers, hints on steam-saving (largely derived from the author's experience) and the stepping-up of heat. An important 20-page section on saving power and electricity is again based largely on experience. Mr. Lyle has found the 2,000-hr expectation of useful life of fluorescent lamps advanced by the makers to be ultra-conservative, since in his factory the average life is about 7,000 hr and in individual cases 14,000 hr has been reached. The book concludes with a discussion of the ice-water-steam substance itself as a matter of general interest.—C.O.B.

Refrigeration. By R. A. Collacott, B.Sc. Pp. 68; figs. 27. Sir Isaac Pitman & Sons, Ltd., Parker Street, Kingsway, London, W.C.2. Price 6s.

This useful little primer outlines the principles involved, first differentiating between the compression and absorption systems. Brines and other refrigerants are discussed next, followed by descriptions of various types of compressors, condensers, expansion valves and evaporators. The book is simply written, mainly to explain the functions of the principal working parts; the reasons why some types are preferable to others are briefly indicated. Each of the six chapters includes calculated answers to typical heat-transference questions.—W.O.F.

Views on the News

Reflections on Current Topics

In a recent talk to the West London Branch of the Association of Supervising Electrical Engineers, Mr. A. W. Jervis, consulting engineer to a large departmental store group, spoke of his observations during a visit to the United States. Generally speaking he disillusioned his audience with regard to the electrical equipment to be found in the average American home. He said he had failed to discover the super-electric kitchen depicted in Hollywood films except in wholesalers' stores and he saw far fewer refrigerators than he had been led to expect.

* * *

Mr. Jervis found that British switchgear was highly regarded and stood up to its work far better than similar American equipment. As regarded air conditioning he said that the plant in the United States was no more advanced than our own. In fact when he was pressed to visit a much-extolled air-conditioning plant he found that it bore the label of a British maker. He gave credit, however, to the Americans for their load-shedding system which, he said, had been inaugurated before the Shinwell era.

* * *

Mr. Alex Milne, of Glasgow, whose name is well known to my readers, does not restrict his literary activities to letters to the *Electrical Review*. Recently a "shocking farce," entitled "An Action for Damages," of which Mr. Milne was the author, was presented at a social evening of the Electrical Society of Glasgow and caused much hilarity. The plot revolves around an action taken by a woman against a questionable contractor after receiving an electric shock. I notice, too, that the programme included a "magical performance" by Mr. Milne, who is plainly a "man o' pairts."

* * *

A reader returned from Bombay sends me an account of the agility of an Indian wireman. My correspondent had just had his drawing-room nicely distempered when entering the room he found the imprint of a large bare foot on the wall about three feet below the ceiling. He could not imagine how it got there, until he noticed a wireman at work next day. What had happened was, that a man on the job after the distempering was finished, had decided to attend to some wiring above the cornice; he had to get at a junction box rather a long way to his right, so instead of getting down and shifting his ladder, he just planted one foot squarely on the wall to steady himself and then with his left hand gripping the ladder, reached out to the box. The Indian workman is almost quadrumanous, and at first, it is strange to see a carpenter, for instance, squatting at his work on the floor, suddenly reach out a leg and grab a chisel with his toes.

* * *

It is nearly thirty years ago that the phrase "Cheap and abundant" was first freely used regarding electricity supply and on the whole the aim has been achieved. True it is that conditions in the past few years have tended to raise its price and restrict its production but electricity has reached a position where it successfully challenges gas in most directions. Consequently, as has happened in many other instances (e.g., gas fires and cookers looking exactly like their electrical counterparts), there is a tendency to adapt the phrase to gas. An attempt was made by the Opposition in the committee on the Gas Bill to secure an amendment laying upon the Area Boards the obligation to provide a cheap and abundant supply of gas. Mr. Gaitskell resisted the amendment on the ground that the Boards must not have imposed on them "duties they might be incapable of fulfilling."

* * *

The Erith Electricity Committee proposes to hold a "suitable function" to celebrate the handing over of its undertaking, but one councillor expressed the opinion at a Council meeting that this was no occasion for rejoicing. This seems to be the view of a local newspaper which headed its report of the Council meeting:—"Electricity Nationalization: 'No Rejoicing.' Erith Cemetery Charges to Rise."

* * *

"Benelux," of which we have heard much recently, is an excellent portmanteau word covering the three States concerned. It is, however, such a good trade name that I am surprised it had not already been adopted by some maker of "sun-ray" equipment or fluorescent lighting fittings.—**REFLECTOR.**

Polish Railway Electrification

Discussion on Mr. J. Podoski's Paper

THE I.E.E. paper by MR. J. PODOSKI on the electrification of the Warsaw section of the Polish State railways reported in our last issue (p. 357) was, in the absence of the author, introduced by Mr. C. C. H. Wade, who had been associated with the scheme.

The subsequent discussion was opened by MR. C. M. COCK (Railway Executive), who said that the picture should have been made complete by including in the tables the cost of the tractors used. The bus-tie equipment was provided with a test set for determining the state of the insulation of the line. Was that test set of any practical value? In his own experience, after some months of operation the insulator for the d.c. overhead line became so dirty that it was of little value.

Protection Against Lightning

Twin contact wires were more expensive than the single system and in India, where it was installed experimentally for the length of one mile, it was shown that current collection from the twin wire was not so good as from the single. The author's experience of lightning arrestors was a repetition of what had happened elsewhere. In India and Australia, where severe lightning storms were sometimes experienced, the protection afforded by a length of cable between the overhead line and the substation had proved effective.

MR. J. E. CALVERLEY (English Electric Co.) said that several of the difficulties which arose in connection with very severe weather were due to the absence of covered accommodation for motor coaches during the cold spell.

MR. H. H. SWIFT (Railway Executive) said that a considerable amount of early work was done by Polish engineers before British engineers arrived at the site. The overhead line was a comparatively simple job. There were very few bridges to be negotiated and the only complications, and those not very marked, occurred at the entrance into Warsaw Central. The double trolley wire mentioned was rather the fashion at that time and certainly the tensioning both of the trolley wire and the catenary was asked for by the Polish engineers. In America with very similar weather conditions such tensioning was almost unheard of.

MR. A. KARLSBAD (Metropolitan-Vickers Co.) said that the personnel were selected from the steam traction service and knew nothing about electricity. They were given a short intensive training. One of the experimental small locomotives with an electric boiler did not prove very satisfactory.

MR. D. J. BACHE (Metropolitan-Vickers Co.) said that on the motor coach the motor-generator set was mounted underneath the car body, exposed to the elements. The machine was self-ventilated, but no air passed through the commutator chambers or through the field coils. Air passed in parallel paths through the armature core ducts and through spiral passages provided over the surface of the machine yoke. During the winter machines were seen practically encased in ice. In the workshop condensation occurred inside the machine and when it was dismantled water poured out. The insulation stood up to that treatment without failure. The 3,000-V motor was a four-pole machine with a single commutator and shunt winding. The confidence placed in the design was fully justified in Warsaw. The successful experience there had been confirmed during eleven years' operation on a similar system in South America. The output from the generator was 10 kW, maintained down to 1,100 r.p.m.

MR. O. J. CROMPTON (B.I. Cables) said that the most interesting item concerning the overhead equipment was the temperature range for which it had to be designed, from — 30 to + 40 deg C. If the design had to be repeated the mid-points would have to be stiffened up and led into a semi-anchor.

The two-contact wiring was of 0·155 in. cross-section and was supplied at the express wish of the Polish engineers, but he did not think that current collection was any better than would have been obtained with a single contact wire. Every previous job carried out by British engineers had been for 1,500 V, and in every one of them double insulation had been used. For 3,000 V single insulation was used for the first time by a British company and it was thoroughly justified by the results. He was certain that this was one direction in which real economies could be made without risk.

Effect of Temperature Conditions

MR. NISSAN (visitor) spoke of his experience of electrification schemes in Italy and, with regard to what had been said by Mr. Crompton about the lack of stiffness at the mid-points, said that his experience of automatic regulation was quite the contrary. Probably it was explained by the difference in temperature conditions, which were much more severe in Poland.

MR. F. LYDAL said that the electrification of suburban and near-suburban lines was supposed to lead to the development of the outer suburbs and influenced the movement of population from the centre of the city. One would think that on the Warsaw system that had been extremely effective, but when one examined the figures in the paper it did not appear to be correct.

MR. C. C. H. WADE briefly replied to the discussion.

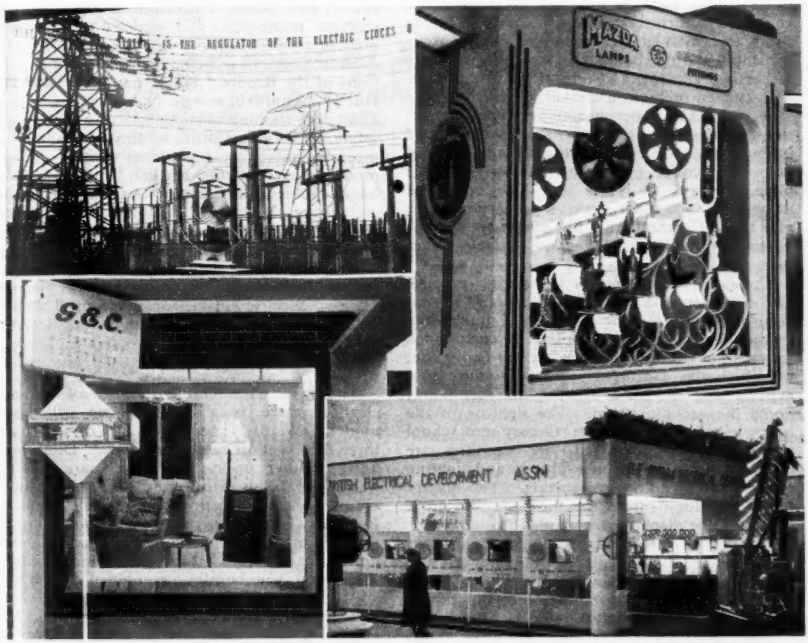
Electricity in the Home

Developments to be Seen at the Ideal Home Exhibition

ALTHOUGH there is quite as much electrical equipment as usual to be seen at this year's Ideal Home Exhibition now being held at Olympia, London, the number of new items is somewhat disappointing. Much of the apparatus, if not on view at last year's exhibition, made its first appearance at the British Industries Fair in May or at the I.M.E.A. Convention Exhibition in June. The small amount of brand-new appliances is presumably attributable partly to manufacturers having now completed their plans for the manufacture of their new post-war designs and partly to the present restriction of production of domestic electrical appliances for the home market. To compensate for the comparative meagreness of really new exhibits, visitors to Olympia can be reasonably sure that most things they see will be available if not immediately, at any rate within a reasonable time. This is a big step forward from last year when delivery dates of months or even a year or more were general.

Many of what new products there are can be seen on the stand of the British Electrical Development Association, the central theme of whose display is "Planning." Attention is first drawn to the electricity supply industry's £370 million plan for new power stations and extensions; a diagrammatic model depicts the Prince of Wales power station at Rotherham. The planning theme is continued with reference to the Association's work in connection with the kitchen, factory, education, water heating, the house service unit, farming, the new Testing House, and textiles.

Dominating the entrance to the stand is a huge perspex model of the new standard 13-A fused plug and socket connected by a cable to an aluminium representation of a transformer. Inside the stand a very comprehensive collection



Top left: One of the display pieces in the "Pageant of the Hours," arranged by Smith's English Clocks. Top right: Stages in lighting history which have lead to the development of the "Mazda" lamp. Left: The lounge, one of three rooms furnished and equipped by the General Electric Co. to demonstrate its latest appliances. Right: A corner of the E.D.A. stand showing the "Perspex" model of the new standard 13-A fused plug and socket

of apparatus includes a new convection heater with ozone unit (Delaney Gallay), a pressure-type percolator (Hutchings Mfg. Co.) and the Rotatime time-switch, together with washing machines, vacuum cleaners, scrubbers, various types of radiators and convectors, period and modern lighting fittings, etc.

Economy in the use of electricity is the theme of the Ministry of Fuel and Power's stand, the entrance to which is flanked by two mechanical figures with meters as bodies, pointing to large meter dials over the entrance. Inside eight displays indicate which appliances use the most electricity, while a centrepiece shows how draught prevention can save fuel.

Electrically Furnished Suite

Apart from a general display of products, the General Electric Co. has arranged three completely furnished rooms—lounge, dining room and kitchen. In each are electric fires, incorporating the company's specially designed dispersive reflector, and typical lighting fittings. The kitchen includes a cooker, 5-cu ft refrigerator, a U.D.B. water heater and wash boiler, the last two appliances being accommodated in built-in cupboards. In the dining room can be seen a coffee percolator, toaster, warming plate, kettle and radio set. The combined television and radio receiver incorporates a new type of cathode-ray tube which enables the picture to be viewed from any angle without distortion.

The latest developments in lighting practice are demonstrated by the British Thomson-Houston Co. A central column, illuminated in changing colours from within, is surrounded by six outer columns arranged in star formation, on which the various aspects of public, commercial and industrial lighting as they affect home life are illustrated. The lighting of the home, cinema, mine, street, factory and school are attractively portrayed, and facilities are provided for studying new fittings and lighting systems for specific requirements. The history of the development of the " Mazda " lamp is traced in one display panel.

Lighting is also well represented on other stands. Attractive fittings in both modern and period designs are shown by Philip Shaw (Contractors), the General Lighting Equipment Co., and Godfrey Lampshades. Fluorescent lighting units are a speciality of Oliver Watts & Co. and Ohmlite Installations. Lighted wall pieces with floral decorations are to be found on the stand of A. J. Miller, while Eralite have a novel bed lamp (the " Dormez ") with a transparent hood for directing the light in the required direction.

Interest in heating apparatus is centred largely on convectors, which can be seen on the stands of the Erroll Sales Organisation (" Erto "), Hurseal (who are also using the oil-filling principle in the " Leda " towel rail), Bratt Colbran (who are also showing fireplace surrounds with radiator insets), Coa Products (" Dimplex " oil-filled unit) and Eralite (a miniature unit called the " Miniflecta "). A combined fire, firescreen and occasional table is a novelty shown by Elfson. British Emulsifiers include in their display a range of " Beta " radiators, while inset models are shown by A. Bell & Co.

An instantaneous water heater (" Harbrix ") is attracting a good deal of attention on the stand of the Dominion Electric Heating Co. Loaded at 5 kW it is claimed to produce 15 gal. of water per hour at 185 deg F. A single combined water flow and on/off switch gives variable out-flow up to 45 gal. per hr with temperatures ranging from 105-185 deg F. The apparatus weighs only 9 lb and measures 8 in. by 5¼ in. by 4½ in. Aidas Electric, while placing special emphasis on their coal-electric Sadia water heater, also display a selection of their standard storage, immersion and under-draining-board models, as well as special models for export.

Great interest is being taken in demonstrations of the Bendix " Home Laundry " and the Hurley " Thor Automagic " combination clothes and dish-washing machine. An improved safety device is a feature of the Servis washing machine, which was the first British cabinet model placed on the market. Elfson have a hand cabinet wringer with an electric drying and airing cupboard and a detachable ironing board. An airing cabinet specially designed for the nursery is made by Dunkleys (London). Apart from the more usual types of electric iron are the J. & H. Walter no-cord model and the " Silex " electric steam iron made by S. Lesser & Sons (1928), makers of the " Silex " coffee percolator.

Cleaners and Polishers

Among a considerable number of vacuum cleaners there is a new Vactric cylindrical model, " W.101," special features of which are three-fan suction and the new " Dimenso " finish. Other up-to-date models are demonstrated by Tellus, Hoover, the British Vacuum Cleaner & Engineering Co., Fleet Electrics, Bylock (who have a new carpet swivel nozzle and are also showing industrial models and a hot-air hand dryer), Electrolux, and Rollnick & Gordon, who besides a combined cleaner and floor polisher have floor scrubbing, polishing and carpet shampooing machines. The Electrix polisher which accompanies the cleaners will work only when the handle is in the normal operating position. An exceptionally easily-operated polisher, unfortunately not yet in production in this country, is to be seen on the stand of S. C. Johnson & Son.

For those with restricted kitchen space Coolfridge have brought out the " Tablfridge " which combines a 5-cu ft refrigerator with a table. This company also has the normal cabinet type machine in capacities of 4, 6, 8 and 12 cu ft. Other refrigerators are displayed by the London Refrigeration & Mfg. Co., Fleet Electrics and Reliance Domestic Appliances.

An extension loudspeaker incorporated in a table lamp is a novelty shown by the Erroll Sales Organisation, which also supplies the "Switchmatic Selecta" unit which enables two stations to be selected and to be switched on and off from any extension loudspeaker. The "Goblin Time Spot" radio is featured on the B.V.C. stand and there are some novelty miniature portable radio sets among a very comprehensive display of both electrical and radio apparatus by Brooks & Bohm. Mains conversion units are included in the Amplion exhibit of radio apparatus.

"The Pageant of the Hours" is the title of a special display arranged by Smith's English Clocks who trace with the aid of a fine collection of historic clocks the whole history of time-keeping. Of particular interest is one of the earliest electric clocks made a hundred years ago and operated by means of zinc and copper plates sunk in moist earth. Fielding & Son (Werneth) and B.V.C. also show ranges of electric clocks.

Practically every electrical device for the all-electric home can be inspected on Whizards stand—even a "Babikit" apparatus for keeping the baby's food, etc., warm. Other electrical devices to be seen included "Solachrome" kettles, coffee percolators and fans (F. J. Tomlinson), "Clarion" burglar alarms (Intercommunication Equipment Co.), paint-spraying apparatus (Domestic Supply Co.), the "Daleware" battery-operated drink mixer (New Era Domestic Products), the "Electric Hostess" trolley (L. G. Hawkins & Co.), the "Teasmade" set, which makes the tea, lights the bedside lamp and wakes the sleeper (B.V.C.), and lighted and heated fish tanks (Fish Tanks).

Lord Citrine at E.D.A. Luncheon

Central Authority's Policy

LORD CITRINE, chairman of the British Electricity Authority, attended the nineteenth annual—and final—luncheon of North West England and North Wales Area of the British Electrical Development Association, held at the Midland Hotel, Manchester, on 4th March. He said that the B.E.A. was alive to the potentiality of nuclear energy in its application to gas turbines, but at the best, this source of energy would be an auxiliary to electricity, not an alternative. It would be anything from ten to fifteen years before there would be any practical issue and even at that stage was unlikely to possess any competitive qualities with existing sources of power.

The B.E.A. was charged with the responsibility of a certain kind, to standardize all manner and shape of things. Turbines had already reached a certain point of standardization.

Standardization implied simplification and economy in costs, but if it shut the door to experiment and the competition of various kinds, it could be a bad thing. They hoped to work in the closest possible collaboration with the Electrical Research Association which they would support financially.

Five hundred and forty-nine separate authorities and twelve composite authorities had to be welded into a single organization and the B.E.A. would go about the job cautiously and in stages. The policy would be to try to secure the maximum amount of decentralization. The industry would be judged by the standard of service it gave to consumers and the economy and efficiency with which that service was provided. He hoped the electricity boards would be given reasonable freedom from political interference.

Recently, a statement was made in Manchester by an M.P. that under the veil of secrecy the B.E.A. had prepared all-embracing plans to put the honest contractor out of business. No such decision had been made by the B.E.A. An assurance had been given to the Electrical Contractors' Association that before any final decision was taken on contracting policy the Association would have the opportunity of submitting its views.

If the industry were to be run economically, it was important that undertakings should not operate indefinitely at a loss. It cost two to two-and-a-half times as much to build a generating station as before the war. That increase had to be reflected in the charges to consumers. An overhaul of the tariff system was undoubtedly due, but they might take anything up to two years to accomplish it. Had existing ownership been continued, prices would undoubtedly have been raised in areas where undertakings had shown losses.

MAJOR J. H. MANDLEBERG, who proposed the toast of "The Electricity Industry," said he did not think coal would ever be produced in this country in sufficient quantity to satisfy the growing demands for electrical power. The primary sources of energy should be explored in the fullest possible manner—nuclear energy, the harnessing of tidal and wind power.

MR. J. ECCLES (deputy chairman of E.D.A. Council) expressed the hope that the functions of the E.D.A. area committees would become part and parcel of each Area Board. We needed 50 per cent more power in our factories, if we were to survive and sell our goods in the free markets of the world. Speeches were also made by LT. CDR. E. J. COOK (who presided), ALD. H. E. RHODES, J.P., and the LORD MAYOR of MANCHESTER.

At the annual meeting held after the luncheon, Mr. P. Bregazzi (St. Helens) was elected chairman and Mr. W. Phoenix (Newton-le-Willows) vice-chairman.

PARLIAMENTARY NEWS

By Our Special Reporter

DURING the second reading of the Local Government Bill in the House of Lords, the Earl of Munster asked the Government for more information concerning the figure which was to be paid in lieu of rates by the railways and the electricity undertakings, and why the valuation was not based on a more up-to-date assessment by waiting until even 1952.

Lord Llewellin said it was interesting to note that the showrooms and shops connected with the electricity undertakings were taken out of the local rates. If there were two shops in the high street of a town, one selling and advertising electric cookers, and the other selling and advertising gas cookers, the local authority would take rates from one and no rates from the other, which seemed slightly odd.

Lord Kershaw said there would be rates levied in respect of the electricity showrooms. Lord Llewellin said that they came in the bulk £11,000,000, but the local people did not get anything in respect of that particular showroom.

Replying for the Government, Lord Henderson said that the amounts in the Bill were based on the trends since the Central Electricity Board was set up. It was argued that if there had been a general revaluation between then and now the amounts would be higher. But there had been nothing to stop individual local authorities from revaluing undertakings in their areas and, in fact, this had been going on, particularly as new stations had come into operation. Secondly, it was by no means clear that a revaluation now, with the industry nationalized, would result in an increase. The valuation of such an undertaking was based on profits, and the British Electricity Authority would work on a lower profit margin than the present companies. Apart from that, rising costs would tend to reduce gross values, and it was a fact that the valuer dealing with the Central Electricity Board for the Central Valuation Committee had purposed a reduction of 5 per cent in the gross value of the Board's undertaking for the next rating year.

Motor Car Interference with Radio

Mr. Blyton, the Assistant Postmaster-General, said the Post Office had co-operated with the motor car, electrical and radio industries in preparing the specification for a cheap device which could be easily and quickly fitted to motor-car ignition systems. This would appreciably reduce interference with wireless sound and television reception. He was having all Post Office motor vehicles and mechanical aids in the service area of the London Television Station fitted with interference suppressors, and many other large users of motor vehicles in the area were making similar arrangements. Every effort was made by the Post Office to encourage users of all types of electrical equipment which might cause radio interference to adopt all practicable measures for reducing such interference.

Area Board Accommodation

Colonel Crosthwaite-Eyre asked the Minister of Fuel and Power why he had not exercised his statutory powers under section 6 (4) of the Electricity Act to require a report concerning the purchase by the South-East Regional Board of Princes Hotel, Hove, in view of the fact that a sum of £160,000 was involved.

Mr. Gaitskell said that the selection and purchase of accommodation was a matter within the discretion of the Area Board and he did not propose to require it to submit detailed information on such a matter.

Electrode Wire

The Minister of Supply (Mr. George Strauss) told Mr. Granville Sharp that measures were being taken to expand the production of the high grade steels needed for wire and to supplement this temporarily, in the case of electrode wire, by special electric furnace production. There was no shortage of wire-drawing capacity for these wires and it was hoped that, with the aid of the supplementary production of high grade steels, the output of wire would meet the most essential demands by mid-1948.

Limiting Domestic Demand

Mr. Gaitskell stated that, as a further step to spread the demand for domestic and non-industrial electricity next winter, he had appointed a committee, under the chairmanship of Sir Andrew Clow, to examine and report within three months on the practicability of installing any instrument by means of which maximum demand and consumption at different times of the day by domestic and non-industrial consumers might be measured and controlled; and the possibility of securing a reduction of the peak demand on the electricity supply system either by the use of any such instruments or by alterations in the tariff for domestic and non-industrial consumers or by a combination of these methods. The members of the committee were: Dr. P. Dunsheath, director, Henley's Telegraph Works Co., Ltd.; Mr. R. J. Edwards, London School of Economics; Mr. J. W. Leach, chief engineer, London Area Electricity Board; Mrs. G. R. Lewin, W.V.S.; Mr. J. D. Peattie, deputy chief engineer (transmission), British Electricity Authority; Mr. W. Dickson Scott, formerly assistant managing director, Selfridges, Ltd.; Mr. E. J. Taylor, T.U.C.; Mr. F. R. Unwin, General Electric Co., Ltd.; and Mr. E. R. Wilkinson, commercial manager, British Electricity Authority.

COMMERCE and INDUSTRY

Electricity Supply Workers' Wages. Cheaper Lamps.

UNDER an agreement made by the Joint Industrial Council for the Electricity Supply Industry about 80,000 workers in the industry will receive an increase of 5s. 6d. next week. The award, an increase of 1½d. an hour for a 44-hour week, applies to all grades of workers in the generation, transmission and distribution side of electricity undertakings in Britain and Northern Ireland.

Lamp Price Reductions

As a measure of assistance to the Chancellor of the Exchequer in his endeavours to improve the country's economic situation, members of the Electric Lamp Manufacturers' Association are to reduce the list prices of certain single-coil 100/130-V and 200/260-V gas-filled tungsten-filament lamps as from 15th March. The 100-W size (clear and pearl) will be reduced from 1s. 9d. to 1s. 8d. and the 150-W size from 2s. 9d. to 2s. 5d. The prices of the 200-W and 300-W sizes will be reduced by 6d. and the price of the 500-W size by 1s.

Listed supply authorities and retailers will receive a stock allowance credit from their suppliers on their purchases during the period between 15th February and 14th March.

E.D.A. Public Speaking Competition

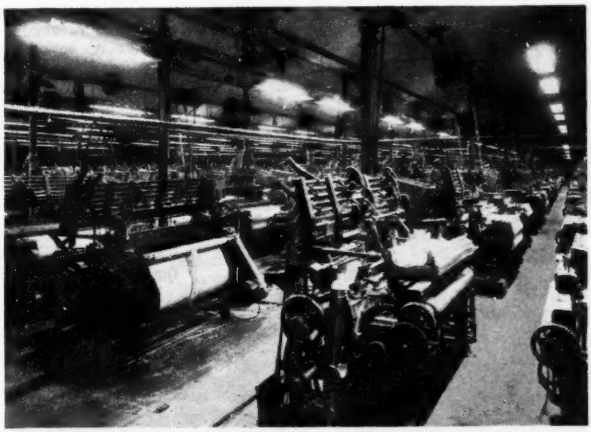
The national finals of the British Electrical Development Association's first post-war Public Speaking Competition will take place at the Institution of Electrical Engineers, London, at 6 p.m. on 18th March, when the judges will be the Dowager Lady Swaythling, President of the Electrical Association for Women, Mr. Harold Purcell, the playwright, and Mr. E. W. Bussey, member of the British Electricity Authority.

Restricted Development at Dundee

Notice of the restriction on the development of electricity supplies has been given to electrical contractors by Dundee Corporation Electricity Department. Mr. R. A. Smith, managing director, Lowdon Brothers & Co., engineers, Dundee, says that the ban will affect electrical contractors, particularly the small contractors, very badly. According to Mr. R. S. Paterson, manager, R. Kilpatrick & Co., Ltd., for some time there has been a great deal of work in converting lighting in tenements from gas to electricity, and one-man businesses had been doing most of that work, which would now apparently have to cease.

Mill Lighting

A scheme now being carried out at the Albert Mills of Hartley & Co., Ltd., Nelson, Lancs, provides for a considerable improvement in lighting throughout the mills. The accompanying illustration shows the weaving shed lighted by fluorescent lamps in Revo "Trufolite" reflectors. Altogether some 250 of these fittings have now been installed, mounted at 8 ft to light centre in rows 13 ft 6 in. apart and spaced at 7 ft centres in gates of looms. The nature of the work, mainly white corset cloths and collar cloths, assists in light distribution by reflection, and the walls are painted cream and blue. The efficiency of the lighting will soon be further improved by the removal of all the overhead shafting, the majority of the looms now having individual drives. The installation has been planned and carried out by the Electrical Equipment Co., Ltd., Leicester.



Fluorescent lighting in weaving shed at Albert Mills, Nelson

Welded Ship Construction

At the annual meeting of the British Corporation Register of Shipping and Aircraft in

Glasgow on 3rd March, Mr. George Barrie, chairman of the Technical Committee, said that they saw no reason why, with proper attention to design, and a careful adherence to the requirements of classification societies, welded construction should not develop the same high degree of safety as had been reached in riveted construction.

Saudi-Arabian Contract for Brush Company

The Brush Electrical Engineering Co., Ltd., has been given a contract valued at £70,000 for the supply of power station and distribution equipment for the town of Taif. Initially the installed capacity of the power station will be 1,200 kW, generated by two 400-kW and two 200-kW diesel driven alternators. Distribution throughout the town will be at 3,300 V, stepped down at load centres for sub-distribution at 415-240 V. Transmission lines will be carried on "P.B." section poles supplied by British Insulated Callender's Cables, Ltd., with Brush pole-mounted transformers at substation points.

Transformers for Sweden

The accompanying photograph shows the second of two 12,000-kVA transformers which have been built by the Brush Electrical Engineering Co., Ltd., for a Swedish paper mill, about to leave the works at Loughborough.

12,000-kVA transformer for export to Sweden

E.D.A. Luncheon

Speaking at the recent annual luncheon in Birmingham of the E.D.A. Central England Area Committee, Ald. W. S. Lewis, chairman of the Midland Electricity Board, said that competition between gas and electricity and between the different area boards would continue after the 1st April, the vesting date. There was no question of holding "funeral services" for such bodies as E.D.A. The Association had for the past twenty-eight years done liaison, publicity and advisory work for electricity supply authorities. Its present constitution would be amended on 1st April, when the supply industry was nationalized. Mr. H. F. Carpenter, chairman of the E.D.A. Council and secretary of the British Electricity Authority, said that nationalization would not mean a ridiculous doctrinaire policy which would destroy the industry.

B.E.A. Welfare Facilities

Replying to criticisms of a recent questionnaire on welfare facilities, canteens, sports activities, social and cultural amenities issued by the British Electricity Authority, Mr. Frank Foulkes, general president of the Electrical Trades Union, expresses the view that the questionnaire augurs well for the intentions of the B.E.A. towards its employees. Although very comprehensive, it is so well documented that it could be completed with ease by any junior employee in an undertaking. The figures and data required should be available in the books of the undertakings. He welcomes any move by the Authority to leave the old methods of welfare behind and is satisfied that if the field covered by the questionnaire represents the extent to which the appropriate department of the Authority intends to institute welfare facilities, the response of the workers to their new employer will be assured.

Token Imports During 1948

The President of the Board of Trade announced last week that arrangements have already been made for the Token Imports Scheme to apply to the following countries during 1948 : Australia, Canada, France, Holland, India, Italy, Pakistan, Sweden, Switzerland, United States and Denmark. (This list differs from that operating during 1947 in that Australia, India and Parkistan are now included and Belgium and Luxembourg, Finland and Norway are omitted.) The annual quota will continue to be 20 per cent of the value of each individual manufacturer's average 1936–38 trade with the United Kingdom in the commodity in question.

Portable electric generators have been deleted from the list of token imports. The list includes the following classes of goods:—Carbon electrodes; electric light bulbs; electric lighting fixtures; switches; dry batteries (torch and high tension); meters; electric fans (domestic); vacuum cleaners and parts; domestic electric

refrigerators and parts; and electrical equipment for cycles and motor cycles.

Production and Export

The main limiting factor in our production drive is steel; there is no immediate shortage of any other raw material. This was stated by the Chancellor of the Exchequer (Sir Stafford Cripps) at a press conference last week. It followed that we could not expand our steel-using industries as much as we would like, but the current production figures for engineering were generally encouraging. He mentioned particularly that deliveries of boilers and accessories had reached new post-war peaks in December last and the same could be said of electric motors and accumulators. According to the new interim index of industrial production, output in 1947 is estimated to have been about 9 per cent greater than in 1946. This winter there had been no loss of production through breaks in the supply of fuel and power, thanks to the mild winter, load-spreading and the more orderly scheme for load shedding. The power plant available reached a new high level towards the end of January. Commenting on the recent export figures, the Chancellor said that the rate in January failed to reach the targets originally set by about 14 per cent but they should be regarded as the start of a steady upward movement.

Trade Announcements

The **Micramatic Electrical Instrument Co., Ltd.**, has appointed W. H. Peyton, 42, Ormonde Park, Finaghy, Belfast, to be its representative in Northern Ireland.

Watford Instruments have now moved to their new factory at Vale Road, Watford. The telephone number remains unchanged.

Report on German Industry

Among recent reports on German industry now obtainable from H.M. Stationery Office is B.I.O.S. 1429. "Modern German Switchgear Practice." (25s.).

Holidays in the Contracting Industry

The National Joint Industrial Council for the Electrical Contracting Industry has ratified certain agreements relating to the substitution of Easter Tuesday and Whit Tuesday as paid holidays in place of Good Friday and August Bank Holiday in all parts of Yorkshire except in the Hull and East Yorkshire, Sheffield, Cleveland, City of York, and Scarborough Districts, and in West Yorkshire (where Easter Tuesday has been ratified as a paid holiday in substitution for Good Friday). Applications have also been received from other areas for the substitution of locally-observed holidays for the days named in the National Agreement.

The National Federated Electrical Association has issued certain explanations regarding the operation of the national time and fares rule which has superseded all local rules covering travelling time and fares with the exception of those operating in London, Manchester and District, and the Mersey District.

Pottery Window Display

"Lighting for Pottery" is the theme of a window display, at the Stoke depot of Crompton

Window display at the Stoke depot of Crompton Parkinson, Ltd.

Parkinson, Ltd., featuring specimens of beautiful china and eathenware, lent by local manufacturers, against a background display unit of Crompton fluorescent tubes and lamps. Among a representative collection of British ceramic art is a replica of the coffee set presented as a wedding gift to H.R.H. Princess Elizabeth, by Adderley's, Ltd.

Generating Plant Orders

It is recorded in the February news-letter of C. A. Parsons & Co., Ltd., that three repeat orders for large turbo-alternators planned by the Central Electricity Board for delivery in 1952 have now been postponed as a result of the cuts in capital expenditure. Orders for earlier completion are, of course, not affected. Recent orders received from overseas include a 30,000-kW turbo-alternator for Brisbane (two similar sets are at present under construction for that city as well as one of 15,000 kW). Other plant has been ordered by the United Provinces Electric Supply Co. (India), Maracaibo (Venezuela) and Port Elizabeth (South Africa).

Invalidation of Palestine Import Licences

As a result of the removal of Palestine from the sterling area, import licences issued before 22nd February are declared invalid except for that portion of the licence for which confirmed credit has been opened. Goods arriving in Palestine against import licences thus invalidated will only be released from Customs on production of documents showing that shipment

was made before 15th March. New applications for licences for goods shipped after this date will be considered only if terms of payment are against letters of credit. New applications for licences will not be considered where the terms of payment are: (a) cash against documents, (b) cash on delivery, or (c) on current account. Imports which have already been received on consignment (including consignments in bond) must be declared before 22nd March to the Controller of Foreign Exchange or transfer of currency will not be considered.

Staff Association

The Telcon Staff Association has been formed to promote the welfare of the staff of the Telegraph Construction & Maintenance Co., Ltd.

Canadian Import Licensing Extended

The Canadian Minister of Finance announced last week that individual imports permits would in future be required for the importation of a specified range of goods, equipment and materials, unless they were shipped and were in continuous and uninterrupted transit to Canada on or before 29th February. The list includes electric steam turbo-generator sets, 700 h.p. and greater, of a class or kind not made in Canada, and complete parts thereof for production use.

Electrodepositors' Conference

The annual conference of the Electrodepositors' Technical Society is to be held at Birmingham on 15th and 16th April.

High-frequency Heating

The Ohio Crankshaft Co. of Cleveland, Ohio, having purchased the induction heating division of the Budd Co., Detroit, the Electric Furnace Co., Ltd., which co-operates technically on all forms of high-frequency heating with the Ohio Crankshaft Co., will accordingly now have the benefit of the Budd developments. These are chiefly connected with internal induction hardening and heating for forging.

German Generating Plant Programme

A comprehensive electrical reconstruction and building plan by German engineers calculated to bring the electricity producing capacity of the combined zones up to 5,550,000 kW by the end of 1952 was recently approved. This production, together with increases to be gained from a similar programme now being planned for industrial stations, will be sufficient to meet the bizonal electricity demands at that time and provide a reasonable reserve. To-day the combined zones have an installed plant capacity, in operable condition, rated at 3,120,000 kW. The repair programme set for the electric utility industry aims at providing 1,100,000 kW of additional generating capacity during the next four years. Building of new installations is designed to add 1,350,000 kW in new plant capacity during the next five years; first priority will be given to hydro-electric plants, second to brown coal burning plants and the third to hard coal plants. Emphasis will be placed on the completion of new plants on which construction was already started before the end of the war. The German committee of nine engineers will advise the German economic administration in carrying out this plan to make the bizone self-sufficient in electrical power.

History of S. Smith & Sons

A well-produced and illustrated book has been published by the organization of S. Smith & Sons (England), Ltd., and its subsidiary and associated companies, outlining the history of the organization from 1851, when Samuel Smith opened a shop in Newington Causeway, to the present day ramifications of the companies which include the production of motor accessories, clocks, industrial and aircraft instruments.

Electrical Commercial Travellers

A general meeting of the Electrical Commercial Travellers' Association is being held at 5 p.m. to-day (Friday) at the Feathers' Hotel, Broadway, Westminster, S.W.1.

Companies Act, 1947

The Board of Trade have made an Order appointing 1st July, 1948, as the date on which all the provisions of the Companies Act, 1947, will come into force.

Trade Publications

Kirolite (Sales), Ltd., 15, Bury Street, London, E.C.3.—Priced catalogue of domestic lighting fittings.

S. Wolf & Co., Ltd., Pioneer Works, Hanger Lane, Ealing, London, W.5.—Leaflet describing a ½-in. general purpose portable electric drill and accessories.

Siemens Electric Lamps & Supplies, Ltd., 38-9, Upper Thames Street, London, E.C.4.—Pocket price list (No. 972) of a wide range of domestic and industrial lamps and accessories.

B.E.N. Patents, Ltd., High Wycombe, Bucks.—Illustrated folder of paint spraying guns and accessories.

Gent & Co., Ltd., Faraday Works, Leicester.—Leaflets and catalogues illustrating staff locator and luminous call systems, liquid level recorders, bells, buzzers and accessories.

Sun Electrical Co., Ltd., 118–124, Charing Cross Road, London, W.C.2.—Priced catalogue (No. 736) illustrating "Crystex" lighting fittings and priced leaflet (No. 739) on heating pads and blankets.

Visco Engineering Co., Ltd., Stafford Road, Croydon.—Technical brochure illustrating the applications of dust collectors and fuem extractors.

Extensions at Leeds

Minister Inaugurates New Plant

THE completion of fifty years of municipal ownership of the Leeds electricity undertaking was appropriately commemorated Friday of last week when the Minister of Fuel and Power, Mr. Hugh Gaitskell, officially inaugurated a 60,000-kW extension to the Kirkstall generating station, bringing its capacity up to 200,000 kW. This extension, carried out to the specification of Mr. F. Nicholls, general manager and engineer, has involved an addition to the turbine house to accommodate two new turbo-alternators, a new boiler house, two cooling towers and various ancillary works. The Department's architect and constructional engineer was associated with the project from its inception and the final extension has retained the architectural features of the earlier work.

Kirkstall power station from the eastern bank of the Aire

The three new boilers are numbered 10, 11 and 12 and generate steam at 630 lb per sq in. (43·3 kg/cm²) at 860 deg F (415 deg C). Each boiler is designed for a steam output of 250,000 lb per hour (83,400 kg/hr) (m.c.r.) and is complete with a two-stage superheater having interstage control by desuperheater, a small economizer and a regenerative type air heater. Air for combustion is provided by forced draught fans in duplicate and the flue gases are passed through an electrostatic precipitator plant before being discharged, assisted by two induced draught fans. Soot blowers are installed to clean the gas side of the boiler, superheater and economizer.

Coal is brought in by road and rail. Rail-borne coal is discharged by wagon tippler and conveyed to the bunkers by bucket elevator and belt conveyors. From the bunkers coal passes through table feeders which regulate the supply to the four Lopulco mills. The ash is removed by the " Hydrojet " system and conveyed to slurry ponds situated at the west end of the site.

In the two new two-cylinder turbines, the pure impulse type high-pressure cylinder has 22 stages and the double flow low-pressure cylinder seven stages, reaction blading being fitted throughout. Two boiler feed pumps, one electrically and the other steam driven, are provided for each of the two turbines; the feed water final temperature is 340 deg F. The two new 33-kV alternators have a maximum continuous rating of 37,500 kVA at 80 per cent power factor.

Two reinforced concrete cooling towers of the Davenport type each having a normal loading of 2,500,000 gal./hr (11,350,000 litres/hr) have been built. Inside the shell is a patented storage trough which is charged by water from condensed vapour. The design is such that a constant pressure of 90 lb (6·32 kg/cm²) is obtained for a 10,000 gal. (45,450 litres) supply for the " Mulsifyre " fire fighting installation. The dimensions of the towers are base diameter 185 ft (56·4 metres), height 250 ft (76·4 metres), and the water entry 29 ft (8·95 metres) above the pond cill.

Principal contractors for the new plant were: Turbo-alternators, British Thomson-Houston Co.; switchgear, Ferguson, Pailin; auxiliary switchgear, Yorkshire Switchgear & Engineering Co.; transformers, Hackbridge & Hewittic Electric Co.; cables, Aberdare Cables, Enfield Cables, and Pyrotenax; boilers, International Combustion; superheaters, Superheat Co.; economizers, E. Green & Son; instruments, George Kent; feed pumps, G. & J. Weir; coal handling plant, Goodall Clayton & Co.; and ash handling plant, Babcock & Wilcox.

Speaking at a luncheon held in the Civic Hall, Leeds, after the inauguration ceremony, Mr.

Gaitskell said that great efforts were being made to increase the available generating capacity in this country. The Kirkstall extension, which had cost about £32 per kW, was a valuable contribution. He had just appointed a committee to investigate the possibilities of the use of mechanical devices to measure or control peak demand, or by alterations in tariffs, or a combination of these methods to reduce the domestic and non-industrial peak load.

Other speakers at the luncheon were the Lord Mayor (Alderman George Brett); Sir John Kennedy, chairman, Electricity Commission; and Councillor E. Hodkinson, chairman, Electricity Committee.

Railway Electrification in Portugal

THE General Electric Co., Ltd., has recently received an order from the Sociedade Estoril, Portugal, for electric rolling stock for operation between Lisbon and Cascais. The order was obtained in competition with Continental manufacturers. It includes motor coaches, trailer coaches and a locomotive. The coaches are to be of all-steel construction, each mounted on two 2-axle bogies, the motor coaches being equipped with four 140-h.p., self-ventilated d.c. motors operating under electro-pneumatic control. The mechanical parts and bodies will be constructed by Cravens Railway Carriage & Wagon Co., Ltd., Sheffield. The locomotive, required for mixed traffic service, is to be of the double-bogie type each bogie having two axles fitted with 1,500-V, 240-h.p. forced ventilated d.c. motors. The highest permissible speed is 50 m.p.h. (80 km.p.h.) and the maximum loads to be hauled will, for passenger service, consist of a six-coach train weighing 240 tons and, for freight service, wagons up to a total of 600 tons. The control gear will be of the electro-pneumatic type. The mechanical portion of the locomotive is to be built by the North British Locomotive Co., Ltd., Glasgow.

Whitaker's Almanack

THE 1948 edition of Whitaker's Almanack, which has just been published, contains 1,092 pages giving more detailed information than in previous editions on a variety of subjects. There is an enlarged educational section and the municipal directory has also been extended and now contains the names of mayors and town clerks, population, rates and other details. Finance, trade, agriculture and industry are reviewed and the workings of the National Insurance Act are explained. As usual there are three editions—the complete edition, cloth bound (12s. 6d. net), the shorter edition, paper bound (7s. 6d. net), and the library edition (which will not be ready for a week or two) containing a special section of up-to-date coloured maps, and half-bound in leather (25s. net). The Almanack is obtainable from the publishers, J. Whitaker & Sons, Ltd., 13, Bedford Square, London, W.C.1.

Trade Marks

THE following applications have been made for trade marks. Objections may be entered within a month from the dates mentioned:—

25th February

MICROGRAPH. No. 649,689, Class 9. Electrical testing appliances for the sparking plugs of internal combustion engines.—Arthur Honey, trading as Arthur Honey & Co., 8, Cool Oak Lane, N.W.9.

ELAC. No. 654,872, Class 9. Wireless, telegraphic, telephonic, television and sound recording and reproducing instruments and apparatus, and parts thereof included in Class 9. —Electro-Accoustics Industries, Ltd., Stamford Works, Broad Lane, Tottenham, N.15.

Designs. Nos. B644,058–9, Class 9. Electric batteries, cells and accumulators.—Oldham & Son, Ltd., 36, Hyde Road, Denton.

RITEMP. No. 645,731, Class 11. Cooking stoves.—English Electric Co., Ltd., Queen's House, 28, Kingsway, W.C.2.

SUPERSTET. No. 652,747, Class 11. Electrically-operated installations for softening and purifying water.—A. F. C. Timpson and F. W. Timpson, 155, Minories, E.C.3.

ARTESCO. No. 656,306, Class 11. Electric light fittings, pendants and wall brackets for electric lights, and electric pendant, table and standard lamps.—L. Shipper and M. Bookbinder, trading as Exchange Electrical Co., 41, Cheetham Hill Road, Manchester, 4.

DENCO (design). No. 655,467, Class 17. Polystyrene plastics in the form of tubes, rods and sheets, for electrical insulating purposes. —Denco (Clacton), Ltd., 355–359, Old Road, Clacton-on-Sea.

3rd March

PRISMAX. No. 654,019, Class 7. Machines for washing and dry-cleaning clothes.—A. E. Walker, "Tyndale," Stanhope Road, N.6.

HYDREX. No. 654,207, Class 7. Domestic laundry machines. No. 654,210, Class 9, Electric flat irons, etc.—Hydrex Products, Ltd., 3, Edith Walk, Malvern.

SYLOPHON. No. 655,125, Class 9. Electric light switches.—C. R. Fearey, 1, Northfield Pass, Cheltenham.

QUIKAVAC. No. 656,077, Class 9. Wireless apparatus, vacuum cleaners and flat irons.—Nash Electrical Co., Ltd., 82, Snow Hill, Birmingham, 4.

TELLUX. No. 654,354, Class 10. Electro-medical apparatus.—Tellux, Ltd., 17-19, Edge Street, London, W.8.

RODEK. No. 655,047, Class 11. Electric toasting appliances.—Rodek Mfg. Co., Ltd., 65, Victoria Street, Windsor.

ETHER-WHEELCO. No. 656,341, Class 9. Instruments and apparatus for measuring, indicating, recording and controlling temperatures.—Ether, Ltd., Tyburn Road, Erdington.

ELECTRICITY SUPPLY

Brunswick Wharf Station. Warrington Transmission Scheme.

Aberdeen.—GRIT ARRESTING PLANT.—In a report on a proposal to install grit-arresting plant at the electricity works at a cost of £29,450, the electrical engineer states that it is necessary to place the order as soon as possible, without waiting for estimates of the cost of the on-site work. If this is done it should be possible to commence the necessary alterations in the summer of 1949.

Birkenhead.—INCREASING SUBSTATION CAPACITY.—To augment the capacity of the Mather Road substation, the Corporation is to install two 750-kVA transformers and an additional switch at an estimated cost of £2,988. The acting electrical engineer is to obtain tenders for the plant.

DIESEL GENERATING PLANT.—The Ministry of Health has authorized the Council to invite tenders for diesel driven generating plant for the Alwen reservoir.

Blackpool.—FARMERS PROTEST.—Protests against the Central Electricity Board's proposal to erect a £5,000,000 power station at Singleton have been made by farmers in the district. Blackpool Corporation is making preliminary arrangements for the Board, and contemplates taking over 98·55 acres of agricultural land. At last week's meeting of the Fylde Rural District Council, it was reported that the Building Plans and Housing Committee had resolved that all other interested parties be communicated with for consideration as to whether, and to what extent, representations should be made to the Area Electricity Board.

Bolton.—SODIUM LIGHTING.—The Corporation has received sanction to borrow £2,566 for the installation of sodium vapour lighting along Blackburn Road from Astley Bridge to Dunscar Bridge.

Cheltenham.—RATE RELIEF.—The Borough Council at its last meeting resolved that a sum up to the statutory maximum of approximately £2,400, should be transferred from the electricity profits (if any) for the year ending 31st March, 1948, in aid of the local rates.

LOANS.—Application is to be made for sanction to loans of £5,000 for consumers' apparatus, and £5,000 for mains and services.

EXTENSIONS.—Electricity is to be provided to the Bushcombe Lane, Woodmancote area, at a cost of £2,500. A scheme for supplying electricity to the 207 permanent prefabricated bungalows to be erected on the Alma Road Estate, will entail the laying of a 3-core e.h.v. main from Hatherley Road to an outdoor substation near the Alma Road railway bridge at a cost of £11,780.

Chorley.—RURAL SUPPLIES.—The Lancashire Electric Power Co. proposes to erect overhead lines for extending the electricity supply to Mawdesley, Bretherton and Heskin in the R.D.C. area.

Dover.—INCREASED TARIFFS.—A recommendation of the Electricity Committee adopted by the Town Council provides for a general increase in electricity charges. The lighting flat rate is to go up from 3¾d. to 4¼d. per kWh, heating from ¾d. to 1d., power from 2¼d./¼d. to 2½d./¾d. and the two-part tariff running charge from 0·5d. to 0·675d.

Edinburgh.—POWER STATION RECONSTRUCTION.—The Public Utilities Committee has approved plans of the new elevations for the Portobello power station reconstruction. The plans are now to be submitted to the Scottish Fine Art Commission. Demolitions have been completed and piling work has been started for the foundations.

Horsham.—REBATE PROPOSAL ABANDONED.—In view of the Order by the Minister of Fuel and Power, the Council has abandoned its proposal to allow a 20 per cent rebate on electricity accounts for the quarter to 31st March.

Kettering.—PROBABLE DEFICIT.—Owing to increases in fuel and other costs it is anticipated that there will be a deficit of about £18,000 on the electricity accounts for 1947-48.

Maidstone.—MEETING NEW DEMANDS.—The Corporation Electricity Committee has approved the provision of a new substation and h.v. cable at Gatland Lane (£6,300) and a new substation and h.v. feeder to supply Plains Avenue School and district (£2,500). A loop main from Sandling substation to Penenden Heath substation, with switchgear, will cost £1,700.

Newcastle-on-Tyne.—COUNCIL TO PAY FOR INSTALLATIONS.—The Housing Committee is to repay £8,828 to 1,073 tenants who installed electric lighting in council houses.

Plymouth.—PRINCE ROCK POWER STATION.—Work is expected to start this month on the new Prince Rock power station to be erected at an estimated cost of £3,000,000.

Poplar.—THIRD SECTION OF BRUNSWICK WHARF STATION.—The Borough Council has received from the Central Electricity Board a further direction providing for the construction of the third section of the generating station at Brunswick Wharf. The direction covers the installation of two 52,500-kW turbo-alternator sets, four 320,000-lb per-hour boilers and ancillary plant. One turbo-alternator set and two boilers are to be ready for commercial operation in July, 1951, and the remaining plant included in the third direction by July, 1952. The Council's consultant (Mr. John Bruce) has

submitted a report on the construction of the third section, together with his estimate of the initial capital expenditure involved, which amounts to £6,127,000.

AUTOMATIC BOILER CONTROL.—A contract with Clarke, Chapman & Co., Ltd., for the supply and installation of boiler units, approved by the Council in January, included the provisional sum of £51,000 for automatic boiler control equipment, the provision of which was left open for subsequent consideration. The C.E.B. has now indicated its approval of its installation.

Scunthorpe.—PRELIMINARY WORK ON POWER SCHEME.—A 25-acre site is now being prepared for the Keadby power station on the banks of the River Trent. The first section, to be ready by the winter of 1952, is estimated to cost £8,500,000, the final cost being approximately £16,000,000.

Stretford.—INDUSTRIAL SUPPLIES.—The Stretford and District Electricity Board is applying to the Electricity Commissioners for consent to borrow £58,890 to cover the cost of giving an increased supply of electricity to the works of Taylor Bros. & Co., Ltd., and the Texas Oil Co., Ltd., Trafford Park.

Warrington.—TRANSMISSION SCHEME.—The electrical engineer reports that the proposed 33-kV transmission system has been approved by the Merseyside and North Wales Electricity Board with a request that the scheme should be proceeded with at once. Six firms have been invited to submit tenders for four 15,000-kVA, 33-kV transformers. The electrical engineer is to obtain prices from British Insulated Callender's Cables, Ltd., for the supply and laying of the 33-kV cables.

DISTRIBUTION WORKS.—The Corporation has approved the provision of a new substation at Liverpool Road, Great Sankey; the extension of the existing substation at Hood Lane, Great Sankey (£8,641); and the laying of mains for supplies to a new permanent housing site at Poplars Avenue, Orford (£7,172).

Overseas

East Africa.—NO NATIONALIZATION YET.—The Governments of Kenya and Tanganyika have decided against public control of electricity undertakings for the time being. State ownership was proposed in a report to Mr. Arthur Creech Jones, British Colonial Secretary, by Mr. C. R. Westlake, former Finchley electrical engineer, who drew up the scheme to build a £5,000,000 hydro-electric power plant in Uganda. Both Governments consider their resources so severely taxed by other projects that they are not in a position to assume responsibility for the generation and supply of power, it was stated. The decision does not, however, preclude them from raising the question in future. The Kenya Government is supporting the application by the East African Power & Lighting Co. for additional capital to carry out developments.

India.—BHOPAL HYDRO-ELECTRIC SCHEME.—The Government of Bhopal is considering a 12,000-kW hydro-electric and irrigation scheme on the Kolar River, a tributary of the Nerbudda. It is stated that the scheme would be complementary to the Central Government's Nerbudda Valley project and would take three years to complete at a cost of 40 million rupees.

"T.V.A." SCHEME.—A plan to control floods and irrigate about 763,000 acres of land in the Damodar River Valley in Bengal, India, will be put before India's Dominion Parliament in its next session. To be worked on the lines of the Tennessee Valley Authority by a "Damodar Valley Corporation," the scheme will also provide for an electric power supply of 350,000 kW. It will cost 550 million rupees (£42,000,000) and will take about ten years to complete.

South Africa.—VRYBURG POWER PLANS.—The Administrator of the Cape Province has sanctioned a loan of £85,000 to the Vryburg municipality for the building of a power house and the installation of plant for a new electricity scheme.

TRANSPORT

India.—ELECTRIC RAILWAY FOR CALCUTTA?—The construction of over 20 miles of electric railway encircling Calcutta and connecting with the existing suburban lines of the three railway systems now serving the city is understood to be one of the main recommendations of the Calcutta Terminal Facilities Committee.—*Reuter's Trade Service.*

South Africa.—IMPROVED RAILWAY SERVICES.—Railway engineers are at work on 31 improvement schemes in the Transvaal, estimated to cost a total of £16,300,000, to provide adequate services for present and future industrial requirements on the Reef, at Vereeniging, and in the new goldfields of the northern Orange Free State. The new £2 million Prospect goods yard in Johannesburg now under construction will be all-electric. Good progress has been made with the redesigning and electrification of the Germiston station and marshalling yards. The scheme will cost nearly a million pounds. To cater for the rapidly expanding industrial demands of Vereeniging and Vanderbijl Park, and the heavy transport demands of the Orange Free State goldfields, both lines between Johannesburg and Vereeniging are being doubled, straightened and electrified.

Sunderland.—TRAMWAY DEFICIT.—For the first time in their forty-eight years' existence, Corporation trams are expected to show a deficit of £17,847 for the current year, compared with a profit of £9,337 for 1946-47. Income is estimated at £234,413 and expenses £252,260. The tramway loss is offset by a profit of £16,932 on the buses. The Corporation has applied for sanction to increase fares.

Power Factor Measurement

Method Employing Single Meter

By R. A. Guest, B.Sc.(Eng.), A.M.I.E.E.

UNTIL recently, the need for measuring power factor has been largely confined to power stations and factories employing heavy machinery. For that reason, the apparatus and methods generally employed are not suitable for the small electrical contracting workshop. The advent of fluorescent lighting with the need for p.f. correction has

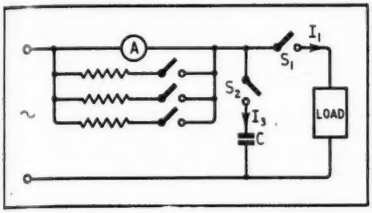


Fig. 1

made it highly desirable for some simple and ready method of checking power factor to be available to the small contractor. In fact, there are certain supply authorities which, insisting on p.f. tests for fluorescent lighting installations, send out their inspectors with a complicated arrangement of ammeter, voltmeter, kWh meter and stop watch. In the arrangement described a single meter giving three readings for three different switch positions will provide quick checking of any power factor at mains voltage.

The principle is simple and consists of measuring the change in current to the particular load brought about by shunting a condenser across it. The power factor can then be calculated, to a degree of accuracy limited by the accuracy of the meter measuring the current from the supply. In Fig. 1, C is an ordinary 8μF condenser as used in fluorescent fittings, and A is an a.c. ammeter with a normal range of 0–1 A. Shunt multipliers can be used when it is required to test several units in parallel. The current in the load, I_1, is measured with S_1 closed and S_2 open, and is represented in Fig. 2 by the vector OA, the power factor of which is to be determined. If S_2 is closed, the current through the meter is changed to a new value, I_2, represented in Fig. 2 by the vector OB. This current is equal to the vectorial sum of I_1 and the current through the condenser, I_3. The latter current is represented by the vector, OC and can be assumed to be 90 deg out of phase with the voltage vector, OX since the condenser's internal resistance has a negligible effect. Its magnitude can be measured by closing switch S_2 with S_1 open but it is constant for any particular mains voltage. Since the vector OB is the sum of the vectors OA and OC the problem resolves itself into solving the triangle OBC (the vector CB is, of course, identically equal to the vector OA). The required power factor is given by the cosine of the angle θ which is equal to the sine of the angle OCB. This is found in terms of I_1, I_2 and I_3 by ordinary trigonometrical analysis, and is given by the expression:—

$$\text{Power factor} = \frac{2\sqrt{S\,(S-I_1)\,(S-I_2)\,(S-I_3)}}{I_1\,I_3}$$

Where $S = \frac{1}{2}\,(I_1 + I_2 + I_3)$

The above formula is not too difficult to work out by slide rule, and it is a simple matter to draw families of curves connecting

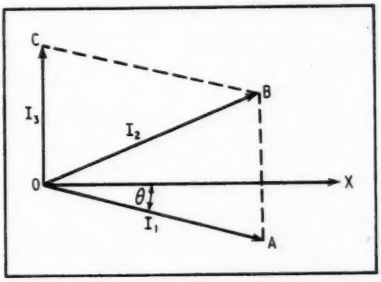


Fig. 2

I_1, I_2 and power factor for any value of I_3 which will depend on the mains voltage. The whole apparatus can be built into a box with inlet and outlet plugs and sockets and with toggle switches on the front, making an instrument which is portable, adaptable, and very useful.

Australia.—SUBURBAN ELECTRIFICATION ADVOCATED.—A report submitted by a special committee appointed to investigate the project has recommended the electrification of the Brisbane suburban railway system, employing 1,500-V, d.c. overhead contact wires and all-steel multiple-unit cars. The estimated cost is £2,500,000.

Malayan Electrical Imports

Rapid Recovery of Trade

THE inauguration of the new constitution for Malaya finds that country in a more promising condition politically and economically than at any time since the Japanese were turned out. One centralized Government now welds the Federated and Unfederated Malay States together with the Straits Settlements, and offers Malays, Chinese and Indians a greater part in the life of the country than before. Trade generally last year was double that for 1946, about one quarter in value of the exports having gone to the United States.

Detailed figures have just been issued showing a remarkable advance in the electrical import trade between the second and third quarters of 1947. The principal items, with notes of increases between the two periods, are shown in the accompanying table. They give a close insight into the varied nature of the trade and also of the new competition that is arising.

Class and Suppliers	1947 July-Sept. ($000)	Inc. or dec. on previous quarter ($000)
Automobile lamp bulbs	128	+ 86
From United Kingdom	90	+ 66
„ *United States*	29	+ 12
Flash and torch lamp bulbs	92	+ 54
From Hong Kong	40	+ 28
„ *Holland*	1	+ 1
„ *United States*	17	— 3
Other electric light bulbs 60 W and under	461	+ 163
From United Kingdom	309	+ 100
„ *Australia*	71	+ 51
„ *Belgium*	33	+ 25
„ *Holland*	47	+ 11
Ditto 61 to 150 W	167	+ 64
From United Kingdom	138	+ 55
„ *Australia*	16	+ 5
„ *United States*	12	+ 11
Ditto over 150 W	66	+ 21
From United Kingdom	57	+ 17
„ *Australia*	5	+ 2
„ *Holland*	2	+ 1
Electric hand flash lamps	738	+ 160
From Hong Kong	589	+ 117
„ *United States*	32	+ 7
„ *China*	38	+ 2
Other electric lamps	94	+ 42
From United Kingdom	65	+ 30
„ *Australia*	20	+ 7
Electric lighting accessories	604	+ 225
From United Kingdom	474	+ 196
„ *United States*	93	+ 89
Electric refrigerators	1,231	†
From United Kingdom	102	—
„ *United States*	1,009	—
Electric refrigerator parts	157	+ 91
From United Kingdom	38	+ 14
„ *United States*	94	+ 59
Electric fans	396	+ 226
From United Kingdom	326	+ 202
„ *India*	41	+ 16
„ *Australia*	18	+ 5
Wires and cables, not telegraph or telephone, rubber insulated	1,781*	+ 767
Ditto, insulation other than rubber	400	+ 41
From United Kingdom	352	+ 40
„ *Australia*	46	+ 1
Ditto, telegraph and telephone, not submarine	112*	—
Ditto, submarine	709*	+ 374
Electrical instruments, not telegraph or telephone	232	+ 96
From United Kingdom	208	+ 89
„ *United States*	17	+ 2
Electro-medical apparatus	36	+ 29
From United Kingdom	27	+ 22
„ *United States*	8	+ 6
Accumulators	21*	+ 11
Batteries	1,033	+ 549
From United Kingdom	753	+ 423
„ *Canada*	114	+ 106
„ *United States*	60	+ 15
„ *Australia*	49	+ 12
„ *New Zealand*	56	—
Ditto for hand flash lamps	1,792	+ 559
From Hong Kong	485	+ 42
„ *Australia*	427	+ 106
„ *United States*	500	+ 293
Radio receiving sets, excluding valves	2,455	+ 1,258
From United Kingdom	1,956	+ 938
„ *Holland*	182	+ 76
„ *United States*	145	+ 136
Radio transmitting sets, excluding valves	221*	+ 11
Radio valves	104	+ 34
From United Kingdom	96	+ 29
„ *Australia*	5	+ 3
Radio parts and accessories	213*	+ 96
Telegraph and telephone apparatus other than radio	242*	+ 55
Elec. goods and apparatus n.e.s.	1,785	+ 687
From United Kingdom	1,536	+ 623
„ *Canada*	32	+ 4
„ *Hong Kong*	7	—
„ *Australia*	86	+ 28
„ *France*	11	+ 6
„ *United States*	91	+ 21
Convertors and transformers	321	+ 137
From United Kingdom	286	+ 129
„ *France*	24	+ 24
„ *United States*	11	+ 2
Generators	358	+ 200
From United Kingdom	173	+ 53
„ *United States*	166	+ 143
Motors, 25 h.p. and under	261	+ 97
From United Kingdom	223	+ 85
„ *United States*	28	+ 11
Motors, 26 to 100 h.p.	114*	+ 59
Motors over 100 h.p.	75*	†
Switchgear	235	+ 40
From United Kingdom	217	+ 31
„ *Switzerland*	8	+ 8
„ *Australia*	9	—
Other electrical machinery	134	+ 52
From United Kingdom	105	+ 43
„ *Canada*	8	—
„ *Australia*	4	+ 3
„ *United States*	17	+ 6

* Wholly or mainly from United Kingdom.

† Comparative figures not available.

FINANCIAL SECTION

Company News. Stock Exchange Activities.

Reports and Dividends

Midland Counties Electric Supply Co., Ltd.—Trading profits of the operating companies for 1947, after taxation, amounted to £1,336,210, against £1,257,561 for the preceding year. Of this £924,040 (£857,073) has been appropriated for depreciation and reserves in the operating companies. Net revenue, after debenture stock and loan interest and tax for the year, amounts to £356,898 (£339,953). A final dividend of 6½ per cent (against 4 per cent and a bonus of 2½ per cent) is recommended, making 10½ per cent for the year (same).

Bruce Peebles & Co., Ltd., report a profit for 1947 of £44,239 (against £29,474) after depreciation and transferring £20,000 (£25,000) to depreciation reserve. A sum of £35,000 is brought in from taxation reserve not now required. Research and development reserve receives £35,000 (£15,000) and general reserve £25,000 (nil). An ordinary dividend of 5 per cent and a bonus of the same amount are again to be paid and £24,747 (£18,095) is carried forward.

The County of London Electric Supply Co., Ltd., reports a net revenue for 1947 of £2,672,659, as compared with £2,827,530 for 1946, to which is added £993,398 brought in and £5,115, profit on sale of Government securities, making £3,671,172. After deducting debenture interest, etc., transferring £957,279 to depreciation reserve and providing £745,000 for taxation, there is a balance of £1,581,661 (against £1,568,767 for 1946). The ordinary dividend for the year is maintained at 10 per cent and £1,006,292 is carried forward. Sales of electricity during the year totalled 1,727 million kWh (against 1,694 million kWh) and the maximum supply demanded rose from 490,009 to 532,206 kW.

Thorn Electrical Industries, Ltd.—The prospectus was published on Monday last for an issue of 400,000 5 per cent second cumulative preference shares of £1 each at 22s. per share. A net amount of £421,000 from the issue, together with £95,000 from the recent issue of 80,000 ordinary 5s. shares at 23s. 9d. to Sylvania Electric Products of U.S.A., will be used to finance a development programme for the incandescent and fluorescent lamp side of the business. Arrangements have been completed with Sylvania Electrical Products, Inc., for the sale to the company of certain machinery and for the exchange of technical information and service.

The Electrical Distribution of Yorkshire, Ltd., reports a net profit for 1947 of £268,445, as compared with £252,546 for 1946, which with £58,000 brought in, makes £326,445. Depreciation and reserve receive £150,000, and it is proposed to pay a final ordinary dividend of 4½ per cent, again making 9 per cent for the year. The balance carried forward is £58,893. Sales of electricity during the year totalled 150 million kWh (against 130 million kWh).

Cable & Wireless (Holding), Ltd., reports a balance for 1947 of £1,228,696 (compared with £1,259,641 for 1946) but this figure includes £863,000 taken from profits placed to reserves by subsidiary companies in earlier years. After providing for the preference dividend and the usual 4 per cent dividend on the ordinary stock £417,887 (£386,677) is carried forward. Compensation for the shares formerly held in Cable & Wireless, Ltd., remains to be determined by arbitration, consequently no income from this source was received in 1947, though interest when fixed will be paid from 1st January, 1947.

The Electrical Finance & Securities Co., Ltd., reports a balance on profit and loss account of £49,457 for 1947, as compared with £49,438 for 1946. The final dividend is 6 per cent and a bonus of 5 per cent, make 15 per cent, less tax, for the year (same) and £136,179 is carried forward (against £123,434 brought in).

Lancashire Dynamo & Crypto, Ltd., reports a net profit for 1947 of £104,125, as compared with £92,382, for the preceding year. The final dividend is 10 per cent, plus a bonus of 7½ per cent, again making 22½ per cent for the year.

London Associated Electricity Undertakings, Ltd.—Net profits for 1947 amount to £380,570 compared with £381,109 for the previous year. A final ordinary dividend of 3½ per cent is recommended, again making 6 per cent for the year.

The Metropolitan Electric Supply Co., Ltd., reports a net profit for 1947 of £347,271, compared with £528,215 for the previous year. The distribution for the year is maintained at 9 per cent by a final payment of 6 per cent.

Lightalloys, Ltd., has declared an unchanged interim dividend of 5 per cent.

Waste Heat & Gas Electrical Generating Stations, Ltd., recommends a final dividend of 5½ per cent, again making 8 per cent for the year.

Heenan & Froude, Ltd., have declared an interim dividend of 5 per cent (against 6 per cent).

The Lancashire Electric Light & Power Co., Ltd., reports a profit for 1947, before taxation, of £413,538, as compared with £386,494 for 1946. Taxation requires £187,535 and debenture redemption £15,326. The final ordinary dividend is 5 per cent, making 7½ per cent for the year (unchanged) and £1,7762 is carried forward (against £15,523 brought in).

New Companies

Globelight Industries, Ltd.—Registered 4th March. Capital, £50,000. Designers, manufacturers, importers and exporters of, and dealers in, appliances, apparatus and machines used in connection with the storage, accumulation, supply, distribution, generation or employment of electricity, batteries, accumulators, coils, switches, fuses, etc. Subscribers: F. Pickering and F. L. Self. Solicitors: Slaughter & May, 18, Austin Friars, E.C.2.

Albert E. Ford, Ltd.—Registered 6th February. Capital, £2,000. To acquire the business of a radio and electrical engineer carried on by Albert E. Ford at Plymouth. Permanent directors: A. E. Ford and Mrs. A. L. Ford. Regd. office: 7, George Street, Plymouth.

M. & E. Services (Bangor), Ltd.—Registered 6th February. Capital, £2,000. Electrical and mechanical engineers, etc. Directors: T. A. Beavon (permanent governing director), Effie E. Beavon, W. T. Williams, Margaret E. Astel and Ellen Williams. Regd. office: 32, Dean Street, Bangor, N. Wales.

Modern Electric (Installations), Ltd.—Registered 18th February. Capital, £1,000. Electrical equipment specialists, electrical engineers and contractors, etc. Permanent directors: S. E. Quitak and A. D. Laurie. Regd. office: 42, Bedford Square, W.1.

Cable Boxes, Ltd.—Registered 16th February. Capital, £1,000. Manufacturers of, and dealers in, cable and other boxes and casings, and all apparatus, equipment and gear required for use in connection with the generation of electricity, etc. Subscribers: F. Chambers and H. Sands. Regd. office: Midland Works, Meadow Lane, Nottingham.

Supralux, Ltd.—Registered 16th February. Capital, £1,000. Manufacturers, producers, designers and repairers of, and dealers in, gas discharge and fluorescent tubes, fluorescent chemicals, electric lamps, etc. Directors: V. D. R. P. Gilbert, N. F. Gilbert and E. J. Wyborn. Regd.office: 30a, St. George Street, W.1.

Thompson & Malvern (Preston), Ltd.—Registered 16th February. Capital, £2,500. To acquire the business of electrical engineers and contractors carried on by E. E. Thompson and C. J. Malvern at 263, Fylde Road, Preston. Directors: E. E. Thompson and C. J. Malvern. Regd. office: 263, Fylde Road, Preston.

Electrical Service Co. (Manchester), Ltd.—Registered 14th February. Capital, £1,000. Electricians, engineers, manufacturers and repairers of electrical apparatus and appliances, etc. Directors: A. B. West, G. N. Ainsworth, R. N. Ainsworth and R. Crowther. Regd. office: 56, Church Street, Hulme, Manchester, 15.

Streamlyne Electrics, Ltd.—Registered 25th February. Capital, £3,000. Manufacturers, repairers, dealers and agents for domestic, household and general electrical and other equipment and appliances, etc. Directors: L. St. A. Corbitt, W. L. Geary and W. S. Moffat. Regd. office: 152-4, Broadway, Bexley Heath, Kent.

Merryfield Equipment Co., Ltd.—Registered 1st March. Capital, £1,000. Electrical and mechanical engineers and contractors, manufacturers of, and dealers in, electrical and mechanical appliances, radio, etc. Directors: A. G. Field and H. C. Meredith. Regd. office: 10, Devonshire Row, Bishopsgate, E.C.2.

Telengrad Industries, Ltd.—Registered 2nd March. Capital, £500. To acquire the business of electronic and electrical engineers carried on by Constance R. G. Riant and D. H. Riant at Buryfields House, Bury Fields, Guildford. Directors: Mrs. C. Riant, H. Riant and D. H. Riant. Secretary: G. B. Burr. Regd. office: Buryfields House, Bury Fields, Guildford.

Companies to be Wound Up

Unless cause is shown to the contrary the following companies will be wound up at the expiration of three months from 27th February:—Cavell Batteries, Ltd.; J. Newman & Co. (Electric), Ltd.; and the Wonder Lamp & Lighting Co., Ltd.

Liquidations

D. A. Bowman, Ltd., manufacturers and wholesalers of electrical appliances, Whitecross Street, London, E.C.—At a recent meeting of creditors a resolution was passed confirming the voluntary liquidation of the company with Mr. L. S. Findlay, 4, Charterhouse Square, E.C., as liquidator with a committee of inspection.

Bankruptcies

W. H. Collis, carrying on business at 59, King Street, Fenton, Stoke-on-Trent, electrical engineer.—Receiving order made 13th February, 1948, on debtor's own petition.

R. F. R. Butt, lately residing and carrying on business at 12, Bouverie Road West, Folkestone, under the style of "Erinath," radio and electrical dealer.—Public examination 16th March, at the Sessions House, Longport Street, Canterbury.

J. Hutchings, electrician, carrying on business as the Maynard Electric Service at 16, Maynard Road, Leicester.—Trustee, Mr. G. S. Robinson, 1, Berridge Street, Leicester, released 24th February, 1948.

S. J. Miles, radio and electrical engineer, carrying on business at 134, Queen Victoria Road, Coventry.—Supplemental dividend of 18s. 6½d. in the £, making 20s., payable 24th March at the Official Receiver's Office, Somerset House, 37, Temple Street, Birmingham, 2.

A. H. Smith, electrical engineer, lately carrying on business at 62-64, Lower Sloane Street, London, S.W.1.—Receiving order made on 26th February on a creditor's petition.

STOCKS AND SHARES

THERE are members of the Stock Exchange who claim that most of the markets round the House can be considered well nigh immune from the effects of such shocks as those which have been their portion for the last few weeks. With the last payment of the American Loan, it might almost be supposed that prices would fall fairly sharply. Nothing of this kind happened. It is true that business keeps very much to the "retail" side, and the number of daily transactions is probably lower, on the average, than it has been for many months past. In the circumstances, prices must be said to hold their ground remarkably well. The newly-issued British Transport 3 per cent stock has hardened to 98, and anticipation is looking forward to the coming of the Electricity Stock, which, under present circumstances, would seem likely to be offered on a basis of 100.

Electricity Supply Dividends

Market arrangements in connection with the taking-over of electricity supply securities on 1st April, provide for the stocks concerned to be quoted ex all dividends from 10th March. Settlement for subsequent bargains will be due on 6th April and will take place in British Electricity Stock, free of transfer stamp. In other words, stockholders who sell their holdings after 9th March will retain the interest, or dividends, still due to be paid; while buyers will acquire, in effect, British Electricity Stock pure and simple. Distributions still to come to stockholders include debenture interest accruing up to the vesting date; preference dividends, where due, at the fixed rates; and ordinary dividends at the rate, in most cases, of last year's corresponding payments. Any surplus of profits goes to the Central Authority. Particulars of the new Electricity Stock are expected to be published after business hours on the vesting day.

Maintaining Income

About £350 millions is the amount calculated as being involved in the take-over of electricity supply stocks and shares next month. The event is not expected to stimulate other markets to the extent of the big recovery which accompanied the Home Railway deal. For one thing, the latter operation was three times larger; for another, many of the railway stockholders who sold out for the purpose of reinvestment in the industrial and other markets, have had early cause to repent. Nevertheless, proprietors of electricity securities face a loss of accustomed income which is likely to be severe, especially in the case of the ordinary shares. In addition, having chosen to invest capital in a progressive industry, the equity holders may be ill-suited by a Government security. It is accordingly assumed that the event will not be without influence on other industrial markets, particularly as the latter are now in a position to offer yields of 4 to 5 per cent from such investments as the shares of the leading electrical equipment companies.

Changes on the Week

In the market for electricity supply shares, the tendency over the past week has been for prices to advance fractionally towards the take-over figures. Several of the London companies' shares have been marked up 6d. Movements in electrical equipment issues have been small and irregular. Associated Electrical, English Electric and Electric Constructions have gained 1s. 3d. each. Johnson & Phillips at 67s. 6d. and Westinghouse Brakes at 62s. 6d. are also better. On the other hand, there have been losses of half-a-crown in Murex, now 78s. 9d., General Cables, 45s. and British Thermostat, 22s. 6d. Automatic Telephones have eased to 60s. 9d., Cossors to 15s., and British Vacuum Cleaner to 12s. 6d. In the overseas sections, Nigerian Electric were marked down 3s. 9d. to 35s., and Palestine "A" a further 2s. 6d. to 32s. 6d. Anglo-American Telegraph issues have again lost ground: the preferred at 110 is down 5¼. B.E.T. preferred has reacted 10 points to 180, and the deferred 45 to 1805. Cable & Wireless ordinary is 2 lower on the week, the annual report failing to assist the price. Great Northern Telegraphs dropped 3 to 25¼, on account of political developments abroad.

Shares on Offer

The following is a selection of electrical equipment shares currently on offer in fairly large lines. For purposes of comparison, last year's highest quotations are shown in parenthesis against present prices:—

Ordinary	Price	Div. %	Yield %
A.E.I. £1 ..	72s. 9d. (94s. 3d.)	15	4·1
Crompton P. 5s.	26s. 3d. (35s. 3d.)	22½	4·3
Chloride El. £1	5 (5¼)	20	4
C. A. Parsons £1	62s. 6d. (85s. 6d.)	12½	4
Crabtree 10s. ..	38s. 6d. (49s. 0d.)	17½	4·5
Elec. Constr. £1	50s. 0d. (72s. 0d.)	12½	5
Allen West 5s.	10s. 0d. (11s. 9d.)	10	5
Tel. Manfg. 5s.	9s. 6d. (16s. 3d.)	9	4·7
B.I.C. pref. ..	29s. 6d. (34s. 0d.)	5½	3·7
Brush pref. ..	22s. 0d. (26s. 6d.)	5½	5

Dividends and Reports

Hoover 5s. ordinary, now 38s., have been little affected by the satisfactory preliminary profits statement for 1947 and the maintenance of the distribution at 40 per cent. The shares offer a yield of 5¼ per cent. They were 8s. higher a month ago, and were up to 56s. at one time last year. Rheostatic 4s. shares are a rather restricted market around 12s., at which they show a yield of 6¾ per cent on the 20 per cent distribution for the year ended last September. Having raised the interim from 4 to 6 per cent, the company has improved by a further 4 per cent on last year's final, the total being 6 per cent better than for 1946.

Next Week's Events

Monday, 15th March

CARDIFF.—South Wales Institute of Engineers, Park Place, 6.30 p.m. I.E.E. Western Transmission Group. "Some Experiences of Site Insulation Testing on a Power System by the Schering Bridge Method," by W. Hyland.

CHESTER.—Chester Engineering Society, 6.30 p.m. Joint meeting with the I.E.E. Mersey and North Wales and North-Western Centres. "Record of Experience on the Irish Electricity Supply System," by A. Burke, R. C. Cuffe and W. O'Neill.

LONDON.—Savoy Place, W.C.2, 7 p.m. I.E.E. London Students' Section. "Domestic Electrical Installation Practice," by G. J. Hughes.

MANCHESTER.—Engineers' Club, 6.45 p.m. I.E.E. North-Western Students' Section. "Survey of Air Blast Circuit Breaker Design," by A. P. Vacca.

NEWCASTLE-ON-TYNE.—King's College, 6.15 p.m. I.E.E. North-Eastern Radio and Measurements' Group. Lecture by Dr. J. C. Evans summarizing papers read at convention on "Automatic Regulators and Servo Mechanisms."

Tuesday, 16th March

LONDON.—2, Savoy Hill, W.C.2, 6.15 p.m. Association of Supervising Electrical Engineers. "Some Applications of Electricity to Space Heating of Buildings," by H. H. Bruce.

Connaught Rooms, Gt. Queen Street, W.C.2, 12.30 for 1 p.m. Fan Manufacturers' Association. Annual luncheon.

At the Institution of Civil Engineers, Great George Street, S.W.1. Institute of Metals. Annual general meeting (16th–18th March).

MANCHESTER.—Engineers' Club, 6 p.m. I.E.E. North-Western Installations Group. Informal meeting. "Major Conditions Relating to the Supply of Electrical Energy," by G. S. Jackson; "Electrical Installations in Hazardous Atmospheres," by F. H. Merrill; and "Electrical Equipment of Some Machine Tools," by J. C. Jones.

Reynolds Hall, College of Technology, 6.30 p.m. Institution of Electronics (North Western Branch). Annual meeting followed by papers.

Wednesday, 17th March

LONDON.—At Institution of Mechanical Engineers, Storey's Gate, S.W.1, 6 p.m. Institution of Heating and Ventilating Engineers. "Air Heaters," by A. Connor Wilson.

Connaught Rooms, 12.30 p.m. for 1 p.m. Electricity Supply Joint Committee. Luncheon.

PRESTON.—Harris Institute, Preston, 6.45 p.m. I.E.E. North-Western Centre. "Electric Traction on the Southern Railway," by C. M. Cock.

SALISBURY.—Electricity House, 17, New Canal, 6.30 p.m. I.E.E. Southern Centre. "Operational Characteristics of Modern H.V. Wood-Pole Lines," by G. T. Garwood.

Thursday, 18th March

DUBLIN.—Trinity College, 6 p.m. I.E.E. Irish Branch. Faraday Lecture on "Electricity and Everyman," by Dr. P. Dunsheath.

LONDON.—Savoy Place, W.C.2, 5.30 p.m. Institution of Electrical Engineers. "Load Dispatching with special reference to the British Grid System," by A. R. Cooper.

Caxton Hall, S.W.1, 2.30 p.m. Diesel Engine Users' Association. "Further Reflections on the Application of Diesel-Electric Traction," by T. Hornbuckle.

16, Prince's Gate, S.W.7, 7 p.m. Royal Photographic Society. Symposium on "Photography in Nuclear Research."

MANCHESTER.—Reynolds Hall, College of Technology, 6 p.m. Illuminating Engineering Society (Manchester Centre). "School Lighting," by T. S. Jones.

SWANSEA.—Guildhall, 6 p.m. I.E.E. West Wales (Swansea) Sub-Centre. Short papers.

Friday, 19th March

BELFAST.—Central Hall, College of Technology, 7.30 p.m. I.E.E. Northern Ireland Centre. Faraday Lecture on "Electricity and Everyman," by Dr. P. Dunsheath.

BRISTOL.—Grand Hotel. Bristol Electric Club. "Radar and its Applications," by J. H. Nicholl.

COVENTRY.—Technical College, The Butts, 6.30 p.m. British Institution of Radio Engineers (Midland Section). "Methods of Measuring Insertion Loss, Phase Shift and Time Delay of Transmission Networks," by N. E. Head.

LONDON.—Connaught Rooms, 12.30 for 1 p.m. British Electrical Development Association. Luncheon, followed by Annual Meeting.

Savoy Place, 5.30 p.m. I.E.E. Measurements and Transmission Sections. "The Influence of Inverse Time Relay Characteristics on Discriminative Time," by E. W. Connon and E. Smith.

Storey's Gate, S.W.1, 5.30 p.m. Institution of Mechanical Engineers. Annual meeting.

21, Albemarle Street, W.1, 9 p.m. Royal Institution. "Metal Physics," by Sir Lawrence Bragg.

MANCHESTER.—Engineers' Club, 6.45 p.m. Manchester Association of Engineers. Annual meeting and paper "Some Properties of Wire and Wire Products Used in Engineering," by R. S. Brown.

NOTTINGHAM.—Victoria Station Hotel, 6.45 for 7.15 p.m. I.E.E. East Midland Centre. Annual dinner.

Saturday, 20th March

LEEDS.—Electricity Department Offices, Whitehall Road, 2.30 p.m. I.E.E. North Midland Students' Section. Students' lecture on "Trends in Transmission," by A. H. Mumford.

LONDON.—I.E.E. London Students' Section. Visit to Department of Scientific and Industrial Research.

NEW PATENTS

Electrical Specifications Recently Published

The numbers under which the specifications will be printed and abridged are given in parentheses. Copies of any specification (1s. each) may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2.

1943

ENGLISH Electric Co., Ltd., R. J. Welsh and H. G. Yates.—" Governing of free piston type internal-combustion compressors." 4133. 13th March, 1943. (Cognate Application 367/44.) (598530.)

British Thomson-Houston Co., Ltd.—" Control systems for dynamo electric machines." 16937. 17th October, 1942. (598348.)

Westinghouse Electric International Co.—" Electric supply systems for X-ray apparatus." 18420. 4th July, 1942. (598350.)

1944

A. M. Taylor.—" Long distance polyphase electric power transmission systems." 516. 11th February, 1944. (598351.)

Standard Telephones & Cables, Ltd., and A. J. Maddock.—" Heating of dielectric materials." 8526. 5th May, 1944. (598587.)

General Electric Co., Ltd., and D. O. Walter.—" Colour television transmitters." 10757. 5th June, 1944. (598537.)

Standard Telephones & Cables, Ltd.—" Selenium rectifiers and methods of making the same." 14011. 22nd July, 1943. (598588.)

Marconi's Wireless Telegraph Co., Ltd.—" Low velocity television transmitting apparatus." 17540. 27th August, 1942. (598540.)

British Thomson-Houston Co., Ltd.—" Laminated electrical insulation materials." 18688. 29th September, 1943. (598357.)

General Electric Co., Ltd., L. C. Jesty and R. G. Hopkinson.—" Luminescent screens." 21408. 1st November, 1944. (598545.)

Standard Telephones & Cables, Ltd., and F. Gray.—" Manufacture of selenium rectifiers or photo cells." 21461. 2nd November, 1944. (598589.)

General Electric Co., Ltd., J. N. Bowtell and E. H. Nelson.—" Electric discharge lamps." 24104. 1st December, 1944. (598549.)

1945

T. A. Roberts and G. J. Happerfield.—" Electric infra-red heat generators." 1701. 22nd January, 1945. (598474.)

Farnsworth Television & Radio Corporation.—" Focus control for cathode-ray tubes." 2710. 19th November, 1943. (598554.)

Cathodeon, Ltd., and F. H. Townsend.—" Electrical apparatus for vacuum measurement." 8955. 11th April, 1945. (598370.)

F. B. Dehn (A. B. Dumont Laboratories, Inc.).—" Process, and apparatus for reproducing television programmes." 6264. 13th March, 1945. (598364.)

Babcock & Wilcox, Ltd., P. G. Handoll and P. R. Bettle.—" Fluid heater cleaners." 7134. 21st March, 1945. (Addition to 570902.) (598559.)

Farnsworth Television & Radio Corporation.—" Variable gain electron multiplier." 10336. 14th January, 1944. (598601.) " Method and apparatus for forming glass optical devices." 28867. 27th January, 1945. (598505.)

Compagnie de Produits Chimiques et Electrometallurgiques Alais, Froges & Camargue.—" Rotary or semi-rotary electric furnaces with multiple indirect arcs." 10650. 20th April, 1943. (598563.)

R. G. Garfitt.—" Means for conveying electromagnetic energy." 11662. 7th May, 1945. (598375.)

British Thomson-Houston Co., Ltd.—" Glass fibre sheet materials." 13774. 3rd June, 1944. (598378.) " Magnetrons." 18985. 29th July, 1944. (598575.) " Cellular phenol-aldehyde resins." 26872. 20th October, 1944. (598642.) " Electric lamp fixtures." 28859. 6th November, 1944. (598503.)

Compagnie Générale de Télégraphie sans Fil.—" Frequency transposing apparatus." 17331. 20th April, 1944. (598571.)

G. H. Beeching and J. M. Robson.—" Electric motor drives." 18344. 17th July, 1945. (598573.)

A. Reyrolle & Co., Ltd., H. Leyburn, C. H. Lackey and D. H. Towns.—" Electric protective arrangements for sectionalized a.c. circuits." 20337. 8th August, 1945. (598581.)

Hazeltine Corporation.—" Radio position-indicating device." 21884. 15th September, 1944. (598609.) " High-frequency electromagnetic-wave translating arrangement." 27436. 16th November, 1944. (598493.) " High-frequency electromagnetic-wave translating element." 27439. 16th November, 1944. (598494.)

Chloride Electrical Storage Co., Ltd., and R. Gray.—" Electrolyte level indicators and anti-splash devices for electric accumulators." 22585. 3rd September, 1945. (Cognate application 28924/45.) (598413.) " Battery discharge indicators." 22586. 3rd September, 1945. (598414.) " Lead-acid electric accumulators." 22587. 3rd September, 1945. (598415.)

A. B. Poole.—" Shaded pole synchronous electric motors." 22664. 3rd September, 1945. (598431.)

Belling & Co., Ltd., and C. R. Belling.—" Electric fires." 22694. 4th September, 1945. (598435.) " Electric cookers." 22696. 4th September, 1945. (598436.) " Door latches or

fastening devices." 22697. 4th September, 1945. (598437.)

D. J. Evans.—" Electrolytic apparatus." 22737. 4th September, 1945. (598448.)

Siemens Bros. & Co., Ltd., and E. J. Gachet. —" Multi-position electric switching keys." 22743. 4th September, 1945. (598451.) " Electric press button switches." 22744. 4th September, 1945. (598452.)

Allmanna Svenska Elektriska Aktiebolaget. —" Suspending device for the electrodes of electric furnaces." 22836. 7th October, 1944. (Cognate application 22837/45.) (598462.)

Electric Panels, Ltd., and W. N. Mann.— " Electrical heating appliance." 22840. 5th September, 1945. (598463.)

Ace Electronics, Ltd., L. C. Welch and R. J. Cook.—" Apparatus for blowing air and gases, and separating dust, fog, and solid or liquid particles from air and gases." 22859. 5th September, 1945. (598485.)

British Thomson-Houston Co., Ltd., and A. Bowen.—" Film driving mechanism for kinematograph machines." 22880. 5th September, 1945. (598489.)

Standard Telephones & Cables, Ltd., and G. Gilliver.—" Fixing and/or making electrical connections to fine wires or the like." 22902. 5th September, 1945. (598616.)

General Electric Co., Ltd., H. R. L. Lamont and R. G. Robertshaw.—" Crystal rectifiers." 22913. 5th September, 1945. (598620.)

Standard Telephones & Cables, Ltd.— " Valve oscillating or amplifying circuits." 24509. 28th October, 1944. (598640.)

Cinema-Telvision, Ltd., and S. S. West.— " Methods and apparatus for switching electrical circuits." 27331. 18th October, 1945. (598396.)

Ferranti, Ltd., M. K. Taylor and F. C. Williams.—" Super-regenerative radio receivers of the type associated with transmitting means." 29285. 5th November, 1945. (598398.)

Ferranti, Ltd., and M. K. Taylor.—" Super-regenerative radio receivers of the type associated with transmitting means." 29286. 5th November, 1945. (598399.)

Ferranti, Ltd., H. Wood, F. C. Williams and J. R. Whitehead.—" Super-regenerative radio receivers of the type associated with transmitting means." 29288. 5th November, 1945. (598400.)

Ferranti, Ltd., and H. Wood.—" Super-regenerative radio receivers of the type associated with transmitting means." 29289. 5th November, 1945. (598401.)

Diesel Locomotives

Wide Use in America

TWELVE years ago an attempt was made by MR. T. HORNBUCKLE, in a paper he read before the Diesel Engine Users' Association, to indicate the extent to which railway requirements might be satisfied by Diesel locomotives. That paper included a description of what had been done by the former L.M.S. section, with which he was then associated. At that time a number of locomotives of from 150 to 200 b.h.p. with mechanical transmission, had been used for light shunting, but were later discarded, whereas one of 250 b.h.p. and a number of from 350 to 400 b.h.p. with electrical transmission had proved to be successful for freight shunting work.

In another paper contributed to the same Association this week the author remarks that the extent to which this kind of engine is now being used constitutes the greatest challenge that has yet occurred to the supremacy of the steam locomotive.

Diesel-electric locomotives are being widely employed in the United States and are being ordered in steadily increasing numbers; of 600 to 1,000 b.h.p. for shunting and of 4,000 to 6,000 b.h.p. for operating main line trains. Similar types are now being put into use on the British Railways, under somewhat different operating conditions.

The author's comparison of relative merits suggests that the advantages of the Diesel-electric type will justify extensive displacement of steam locomotives only where one-man operation is possible, difficulty is experienced in providing suitable water, and oil is more readily obtainable than coal.

The engines might be more effectively mounted than they have been, but the greatest opportunity for improvement is in respect of the transmission system which is highly successful in tramway and suburban services over comparatively short distances between frequent stops, necessitating high acceleration to moderate schedule speeds. The traction type motor is however less well adapted to high speed work over long distances with few stops. If the gearing of the motors could be changed at about half the maximum speed, thus halving their range of working speed, the weight of the motors and generator could be reduced and better power characteristics obtained. The probable trend is towards lighter engines of higher speed, mounted so as to be quickly removable or easily replaced, which will reduce repair costs.

The type of Diesel locomotive most suitable for British railways will weigh 40 tons (1 ton = 1,016 kg) and be fitted with two engines, each of 500 b.h.p., usable singly or together. Three such units could haul the heaviest trains and a single unit could deal efficiently with the lightest train, reducing the validity of arguments in favour of train-sets and rail-cars, which are not favoured by operating staffs.

CONTRACT INFORMATION

Accepted Tenders and Prospective Electrical Work

Contracts Open

Where "Contracts Open" are advertised in our "Official Notices" section the date of the issue is given in parentheses.

Bath.—29th March. City Council. Electrical supplies for twelve months from 1st June next. (5th March.)

Bedfordshire.—27th March. Education Committee. Electrical installation in temporary accommodation, North Bedfordshire College of Further Education. (See this issue.)

Cape Town.—24th March. Electricity Department. Electrically operated vehicle-actuated traffic control equipment, including cables. Particulars from the Export Promotion Department, Room 55, 35, Old Queen Street, London, S.W.1.

Egypt.—31st March. Egyptian Government. In connection with the invitation for the supply of mechanical and electrical equipment for the Aswan Dam hydro-electric scheme, the Government announces that offers of second-hand Diesel generating sets of 250 kW each will be considered. (20th February.)

Gipping.—31st March. R.D.C. Electrically driven booster pump. Surveyor, Council Offices, Needham Market, Suffolk.

Hale.—24th March. Urban District Council. Four centrifugal pumps, with motors, switchgear, etc., for the Hale drainage scheme. G. B. Kershaw & Kaufman, 1, Victoria Street, Westminster, S.W.1.

Westhoughton.—19th March. Urban District Council. Electric lamps for one year to 31st March, 1949. Particulars from F. H. Walker, surveyor, Town Hall.

Orders Placed

London.—Joint Electricity Authority.—Accepted (revised tender). E.h.v. switchgear for Esher substation (£13,322).—Crompton Parkinson, Ltd.

Maidstone.—Corporation. Accepted. Twenty-four transformers (£12,110).—Brush Electrical Engineering Co. and G.E.C.

Manchester.—Transport Committee. Accepted. Mercury arc rectifiers.—Electric Construction Co. Radio equipment in connection with traffic arrangements.—G.E.C.

Newcastle-on-Tyne.—Education Committee. Accepted. Electrical installation at new metallurgical laboratory at Rutherford College (£172).—Morris & Smiles.

St. Marylebone.—Borough Council. Accepted. Cable work in connection with the Blandford Street substation (£1,939).—Enfield Cables.

Contracts in Prospect

Particulars of new works and building schemes for the use of electrical installation contractors and traders. Publication in this section is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Anglesey.—School, Edern; county architect, Shire Hall, Llangefni.

Audenshaw.—Houses (32) for U.D.C.; Clifford Wild, architect, 72, Bridge Street, Deansgate, Manchester.

Batley.—Dining rooms and kitchens at ten schools; T. Mossop, borough engineer, Town Hall.

Bedlington.—Houses (100), Stead Lane estate, for the U.D.C.; direct labour.

Berkshire.—Nurses' homes at Maidenhead and Wokingham; county architect, 35, Bath Road, Reading.

Bermondsey.—Cottages and maisonettes, St. Marychurch Street, and rebuilding two blocks of flats after war damage, Whites Grounds estate; borough architect, Spa Road.

Birmingham.—Nurses' home at West Heath Sanatorium; W. N. Twist, architect, Sun Buildings, Bennett's Hill.

Factory, Chester Road, Marsh & Baxter, Ltd., Brierley Hill; S. N. Cooke & Partners, architects, Sun Buildings, Bennett's Hill.

Blaydon-on-Tyne.—Aluminium houses (116); U.D.C. surveyor.

Blyth.—Maternity home and child welfare clinic; borough engineer.

Bollington.—New works, Inglesby Road, for Bollington Printing Co., Ltd., calico printers; secretary.

Bristol.—School, Ashton Vale (£49,750); Benson Bros. (Bristol), Ltd., builders, 117, Ashley Down Road.

Broadstairs.—Adaptations at Rimpton Court for use as children's home; Kent county architect, Maidstone.

Burton-on-Trent.—Secondary school, Bluestone Lane and Violet Lane (£155,162); borough engineer.

Croydon.—Houses (130), New Addington; borough engineer; Town Hall.

Secondary school, Heathfield; Riches & Blythin, architects, 77, Park Lane.

Doncaster.—Additional wings and alterations to High Melton Hall, for use as teachers' training college; W. W. Thomas, education architect, Wood Street.

Durham.—Electrical installations in six police houses on the Gilesgate estate; county architect, Court Lane, Durham City.

Exeter.—Primary school, Pinhoe Road estate; H. B. Rowe, city architect, 2, Southernhay West.

Fareham.—New school, Wallisdean (£73,500); Hampshire county architect, The Castle, Winchester.

Hindley.—Houses (50), Castle Hill, for U.D.C.; Unit Construction, Ltd., builders, 21a, Brook Street, Knutsford, Cheshire.

Isle of Wight.—New county technical college, Newport; county architect, County Hall, Newport, I.W.

Islington.—Three blocks of flats, Sparsholt Road; E. C. P. Monson, architect, 120, Moorgate, E.C.2.

Keighley.—Houses (82), Highfield estate, Oakworth; W. Wilkinson, builder, "Oldfield." Oakworth.

Kingsbury.—Extensions to works; Duple Bodies, The Hyde, N.W.9.

Lewes.—Bus station, East Street, Eastgate Street and School Hill junction; Southdown Motor Services, Ltd., Steine Street, Brighton.

Longbenton.—Houses (54), Dudley-Annitsford estate; U.D.C. surveyor.

Maidstone.—Rebuilding part of Towil Paper Mills; Albert E. Reed & Co., Ltd., Aylesford Paper Mills, Larkfield, Kent.

Middlesbrough.—Temporary municipal offices, Victoria Square (£13,000); borough engineer.

Houses (16), Cambridge Road; Kitching & Co., architects, 21, Albert Road.

Newcastle-on-Tyne.—Extensions to factory, St. Mary's Street for Thomas Hedley & Co., soap manufacturers, City Road; plans by the firm's own staff.

Conversion of buildings in Strachan Street into warehouses for Newcastle Co-operative Society; C.W.S. Architects' Department, 90, Westmoreland Road.

Newport (Mon.).—Paper mill; South Wales Board Mill, Ltd., Summerstown Works, London, S.W.17.

Northfleet.—County modern school for girls; Kent county architect, Maidstone.

Orpington.—Houses for agricultural workers (60); U.D.C. surveyor.

Perth and Kinross.—Primary school, Muirton; Ian A. Moodie, county architect, York Place, Perth.

Peterborough. Houses (109), Castor, for R.D.C.; S. Dodson & Sons, architects, Museum Buildings, Priestgate.

Plymouth.—Reconstruction of factory, Octagon Street, for James & Rosewell (Plymouth), Ltd.; Ivory & Partners, architects, 24, Athenæum Street.

Scarborough.—Additions to Scarborough College, Filey Road; W. S. Gray, architect, Filey Road.

Shenley.—Four pavilions, sanatorium, staff block, etc.; C. G. Stillman, county architect, Middlesex House, Vauxhall Bridge Road, S.W.1.

Shoreditch.—Additions to Haggerston Baths, Laburnum Street; borough architect, Town Hall, Old Street, E.C.1.

Solihull.—School, Hatchford Brook, for T.C.; Bragg Bros., builders, Church Hill Road, Solihull, near Birmingham.

Stoke Newington.—Housing scheme, Defoe Road; Howes & Jackman, architects, 1, Verulam Buildings, Gray's Inn, W.C.1.

Sunderland.—Temporary factory at Usworth; Disabled Persons' Employment Corporation, London, S.W.1.

Surbiton.—Additions, Surbiton Assembly Rooms; R. Thirlway, borough surveyor, Council Offices, Ewell Road.

Taunton.—School, Wellsprings, for Somerset E.C.; R. O. Harris, county architect, Park Street.

Tredegar.—Houses (150), Bryn-Pica and Tramroadside (£250,000) for U.D.C.; William Bowers & Co., builders, Hereford.

Tunbridge Wells.—Houses (24), Clifton Road and Eridge Road estate; H. P. Bishop, borough surveyor, Town Hall.

Tynemouth.—Houses (258), Lynn Road; borough engineer, 19, Howard Street, North Shields.

Wandsworth.—Ten blocks of flats, Chetwode Road, Tooting; R. G. Covell, architect, 5, Mitcham Road, S.W.17.

Wheatley.—Secondary grammar school for girls, Holton Park; G. R. Hutton, county architect, Becket Street, Oxford.

Wigan.—Pithead baths at Bickershaw Collieries for Miners' Welfare Commission; J. H. Bourne, architect, 16, Oxford Street, Manchester, 1.

Worksop. — Factory; British Thomson-Houston Co., Ltd., Chesterfield.

T.V.A. Steam-plant Proposal

IT is reported by the *Electrical World* that the Tennessee Valley Authority is reaching the limits of its potential hydro-electric development and anticipates a "critical period" in 1951 or 1952. To meet the ever-expanding demand the Authority considers it necessary to erect a large steam plant; it already has a steam plant rated at 450,000 kW out of a total capacity of 2,538,000 kW.

Congress is being asked to sanction an expenditure of $60 million for a thermal plant in Western Tennessee, construction to begin in July next. A figure of 300,000 kW is given as the need over and above the hydro-electric power available and inquiries have been made regarding a 125,000-kW set to be put into operation by 1951.